

OFFICIAL JOURNAL
OF THE
COMMUNITY ANTENNA
TELEVISION ASSOCIATION

MARCH
1979

CATJ

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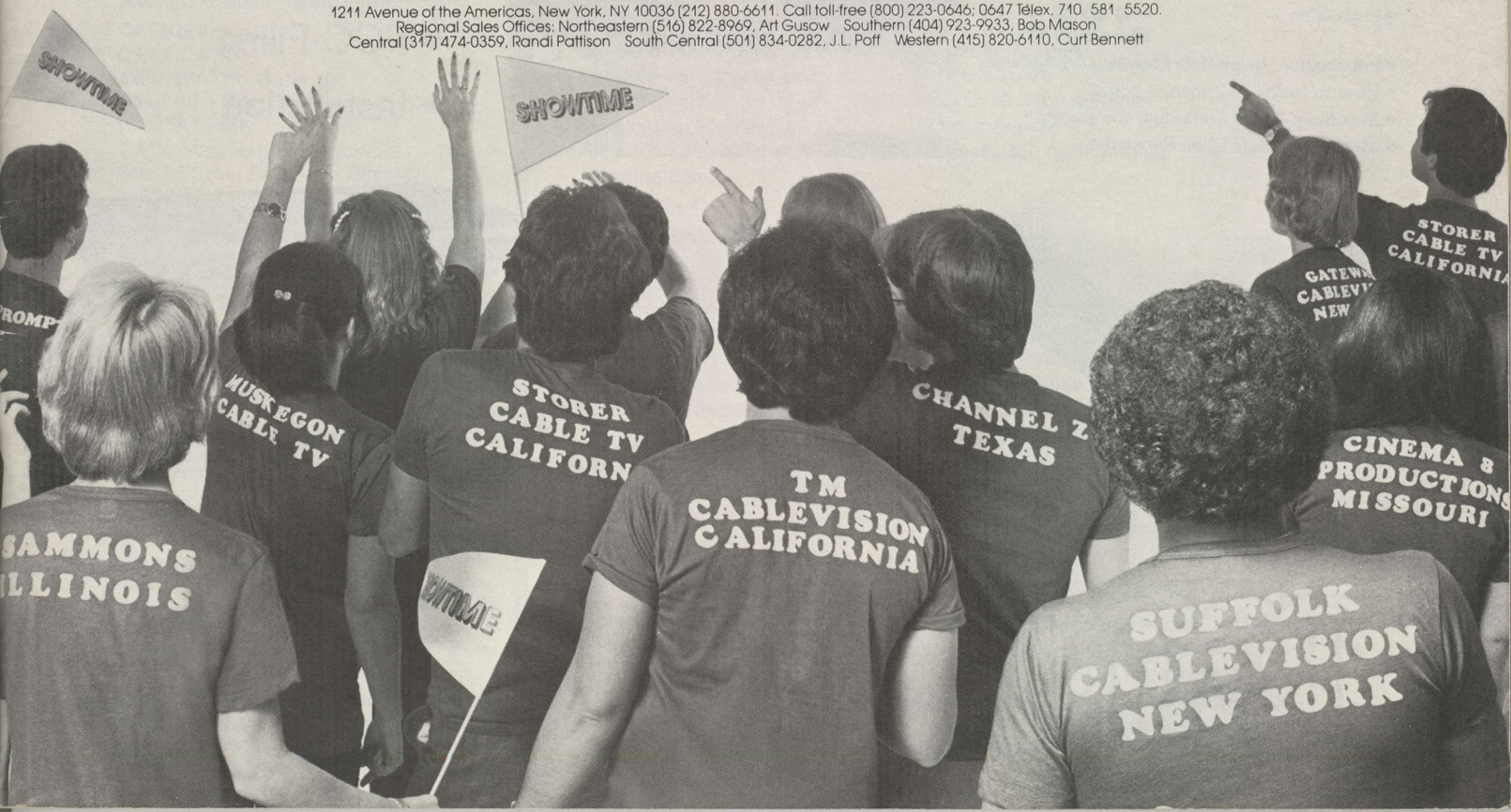
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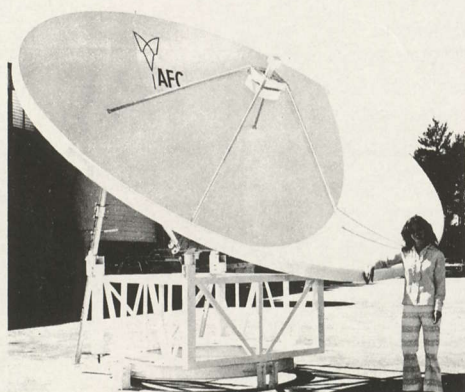
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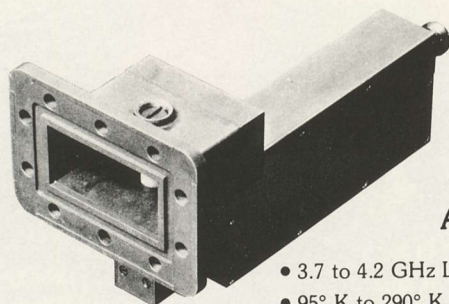


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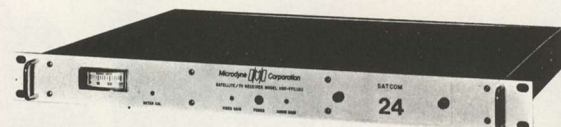


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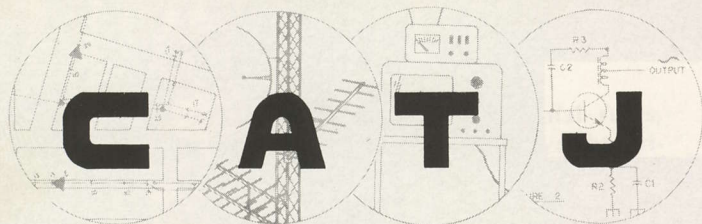
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Volume 6 Number 3

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—FEATURES—

CANADA'S ILLEGAL TV 'NETWORK'—David Brough has thirty TV stations operating throughout Canada. None are licensed. He takes his programming off-the-air and off-cable with a Betamax machine. And he's not in jail. Find out why, starting on page..... 16

THE SUPER STATION BATTLE—With three big-market indies now on SATCOM, some expect a 'battle' to follow for supremacy. In spite of what you may have assumed, WTCG, WGN and KTVU do not look alike. Here's the data to help you compare them for your own cable system carriage..... 24

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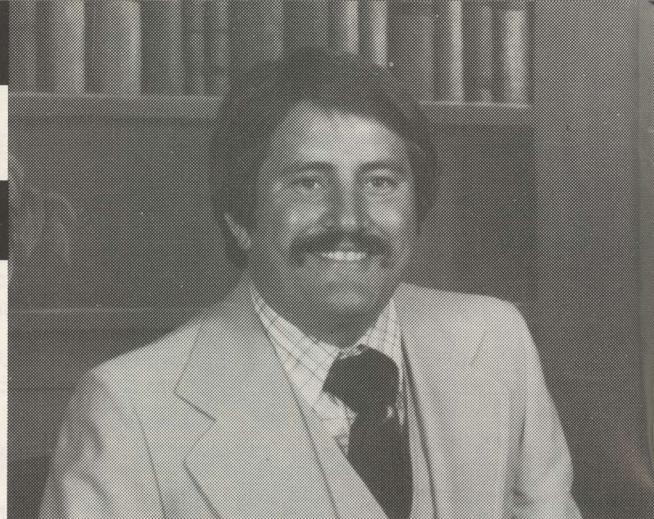
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—OUR COVER—

His name is David Brough. He lives undercover in Ottawa, drives a half-paid for second hand van and he operates a string of 30 TV 'transmitters' fed via Betamax 1/2 inch tapes he creates in his Ottawa flat by combining off-air and off-cable feeds. His story is unique and the wonder of it all is that he is not in jail. See page 16 in this issue.

CATA "TORIAL

BEN CAMPBELL, President of CATA, Inc.



FREEDOM At A Price

Out of the hodge podge of Washington thinking, there seems to be a consensus that somehow, someday the FCC will be either phased out or yanked out of cable regulation. Somehow it is always harder to dis-lodge something that is in place than it is to step over it or go around it.

Congressman VanDeerlin says that if we buy his rewrite bill we will be "free" of FCC rules. And in some areas, state regulation as well. That sounds very interesting on the surface and there has to be a catch someplace.

The catch is that if there are no FCC rules, then we will be "free" to carry whatever broadcast signals we wish to carry. On the surface that sounds like a return to pre-1966 policies when there were virtually no cable policies at all. However the world has changed quite a bit since 1966; for one thing we have a new "Copyright Law".

Congressman VanDeerlin says that we can have this "freedom" from FCC meddling, but only at the "price" of increased copyright fees. In effect, the California head of the House Communications Subcommittee wants to "trade" with us; no FCC signal carriage rules, in exchange for a new set of copyright rates.

How high might the rates be? Nobody can forecast this for sure, but numbers we have heard mentioned in serious tones suggest 3, 4 and even 5 times as much as we now pay. And for the very small systems who won, after a long and hard CATA lead battle, 'exemptions' and very low rates may be looking at ten-fold increases. All for the 'privilege' of carrying any broadcast signals we wish.

Now where might these signals come from? Satellite possibly. But not our present satellite because it is full, and possibly even not via some combination of RCA satellites after the launch of F3 this fall; because that one too will undoubtedly be 'full' of non-broadcast and specialty signals long before these new copyright rules might go into effect. If we end up with cable signals on two or more satellites, we will end up with two or more ground terminals. No problem for the San Diego's of this world. Not practical for the Gridley's.

That says they would or could come off the air. In most systems, the only off-air signals not currently being carried anyhow are other (duplicating) network feeds. If there is one thing the satellite revolution has taught us... it is that virtually any

operator would prefer a high quality, stand-alone-different satellite fed signal to a second NBC or a third ABC, etc. This strongly suggests that even if you were free to carry any off-air signal you wished, given today's satellite dominated signal feeds the chances are very good you might not wish to add any additional off-air signals anyhow.

So just how much would this new 'freedom' be worth? Would it be worth a 3 or 5 or 10 time increase in copyright fees? I think not.

Is it for certain that if the FCC drops signal carriage rules that we will pay higher copyright fees? Will we pay higher copyright fees even if we don't want, need, or can't use these additional signals?

Yes on both questions.

For example, suppose the FCC decided on their own to drop the signal carriage restrictions. Before Congressman VanDeerlin can act on his rewrite of the communications act and before Congressman Kastenmeier can act to revise the copyright law. What then?

There are four ways (under the 1976 Copyright Law) for copyright rates to increase. Pay close attention to what follows because we are talking about taking money out of your pocket and sending it to Washington as a 'way station' to Hollywood:

- 1) **In 1985 the Copyright Tribunal can raise rates on their own, and every five years thereafter... because of inflation.**

Want to bet what happens in 1985 if nothing else happens in the interim? With inflation climbing at 11-12% per year currently, the time span from 1976 to 1985 will almost certainly mean an automatic doubling in the present copyright rates.

- 2) **Congress can change the law at any time. This is what Congressmen VanDeerlin and Kastenmeier are talking about doing.**
- 3) **If the FCC changes either syndicated exclusivity or sports exclusivity rules, the Copyright Tribunal may increase copyright payments for those signals on which syndicated or sports exclusivity applies.**

This says that indie signals, largely programmed with syndicated programs and sports, would surely see the rates raised. These are already the highest-charge signals we have. They could double or triple just because the FCC elects to **change** the rules governing these types of programming.

- 4) If the FCC changes the distant signal rules, rates can be changed and the Copyright Tribunal is required to consider the economic impact on (a) the broadcasters (the users of the copyrighted material) and (b) the copyright holders.

That's no option; that's a **requirement** of the law. Not in 1985, but right then, when the FCC changes the distant signal (i.e. signal carriage) rules.

It could work this way. The FCC would drop the distant signal (signal carriage) rules and the Copyright Tribunal would go into session to decide what impact dropping these rules **might** have on the broadcasters and the copyright folks. Hundreds of hours of hearings later, after the NAB, MPAA and every other big gun that the foes of cable could round up trooped before the Tribunal to state their case, a decision would be reached.

Unmitigated disaster.

Cable's profits would be skewered and carried aloft for review. The recent growth of cable with satellite programming would be analyzed and dissected. It would be the darndest three ring circus ever brought to town. It would be an expensive fight and I'm betting we would lose.

Even if your system got no benefits at all from removal of the distant signal restrictions your rates would end up going up. Perhaps by as much as 10 times.

Not many years ago we clamored and hollered for an end to the FCC's rules on signal carriage. And for

good reason. . . signals or program diversity are our life blood. And the FCC had no sound basis for restricting us in the first place. It is little consolation that now, 13 years after it all began, they apparently agree with us. Because in the interim another issue, Copyright for cable, came along and finally became law. In the process of becoming law it was indelibly woven into our present signal carriage fabric. **And now we can't separate the two.**

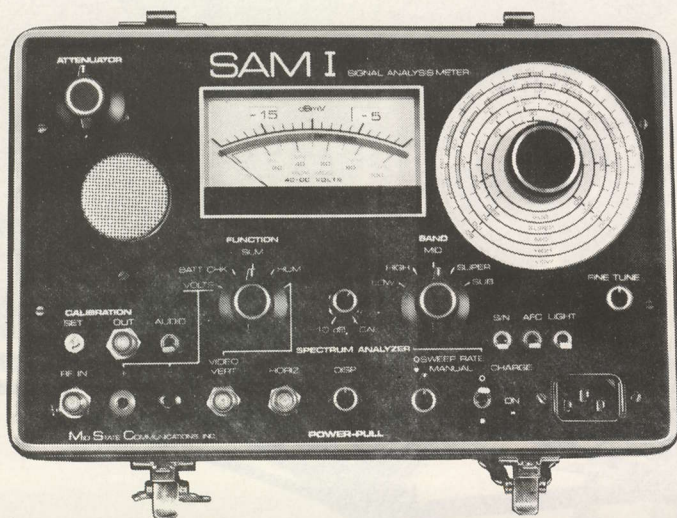
CATA said copyright for cable was wrong in 1974. And in 1975. And again in 1976. But the nation's larger system operators said that we had to have 'copyright legality' in order to face the world square. And now we are stuck with the 'Alfred Stern Legacy'; the FCC and perhaps Congress as well is about to give us a present that we don't need, don't want, and can't afford.

So is there any need for changing the signal carriage rules? What will unlimited signal carriage rights buy us, now that we have so many excellent channels of non-broadcast service already on the satellite and more being planned all of the time? It will buy us 2 or 3 or 10 times higher copyright fees; fees collected against our **total monthly income** for our **total cable service package**, which with every additional satellite signal to our systems becomes less and less dependent upon broadcast signals at all. That's what it will buy us. Higher and higher rates while we are using less and less of the product itself.

Do we really need or want the signal carriage rules changed? By anybody?

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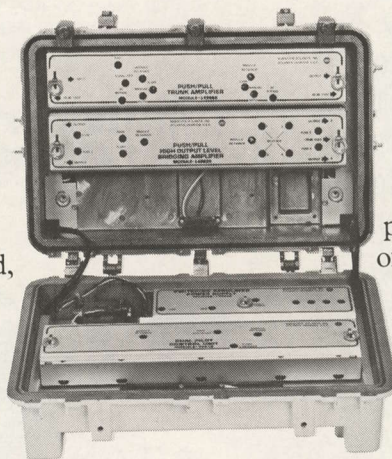


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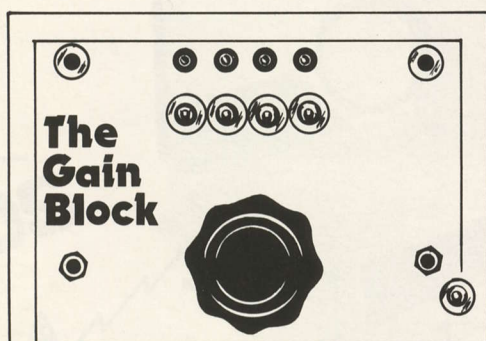
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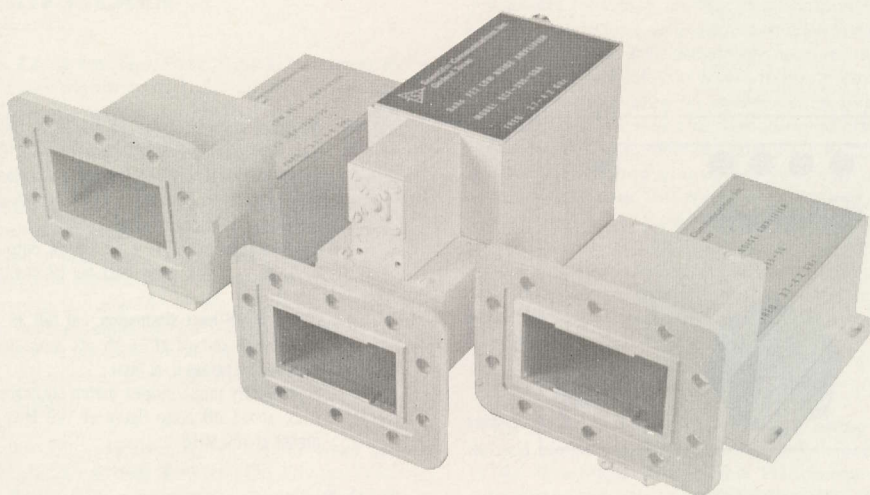
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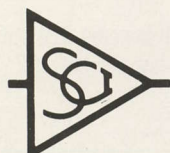
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SCF-395-505	3.70-4.20	50	0.5	1.5	1.25:1	1.25:1	+10
SCF-395-50D	3.70-4.20	50	0.5	1.8	1.25:1	1.25:1	+10
SCF-395-50A	3.70-4.20	50	0.5	2.0	1.25:1	1.25:1	+10
SCF-395-50	3.70-4.20	50	0.5	2.6	1.25:1	1.25:1	+10



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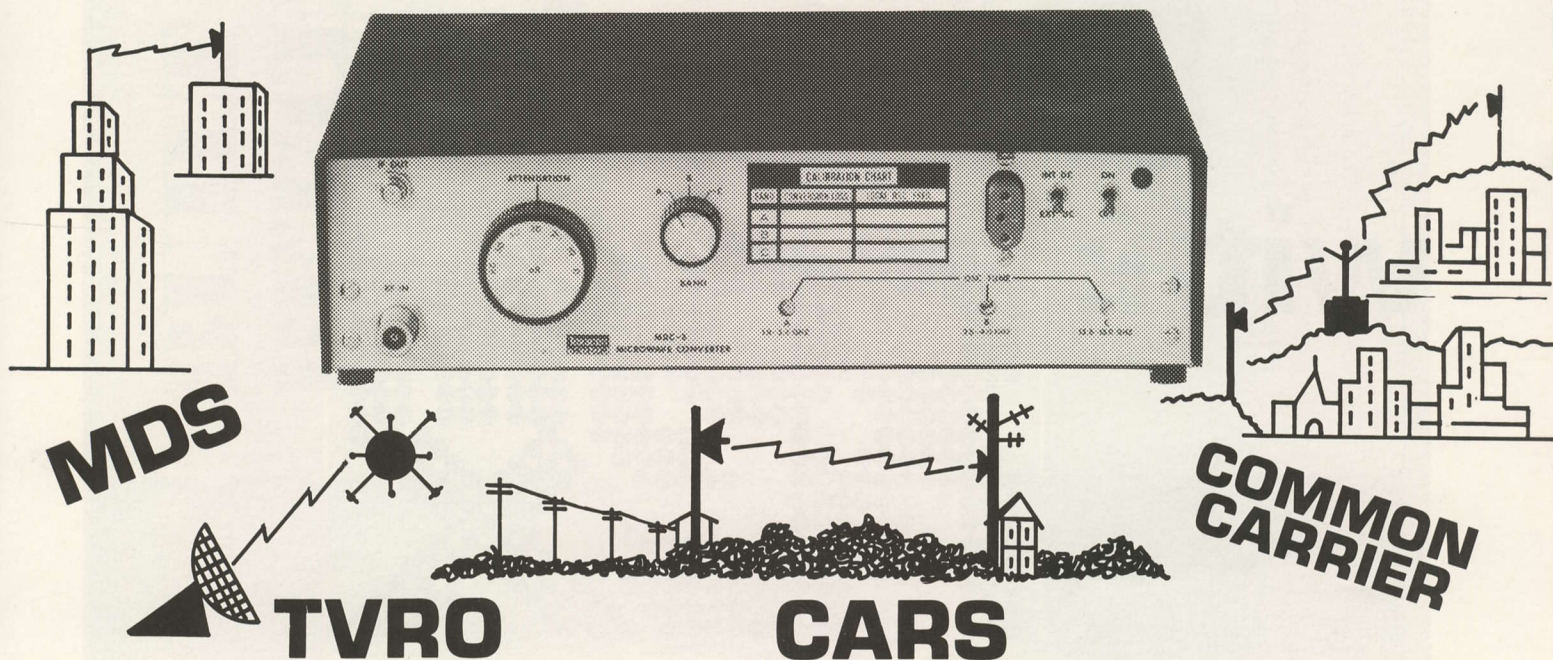
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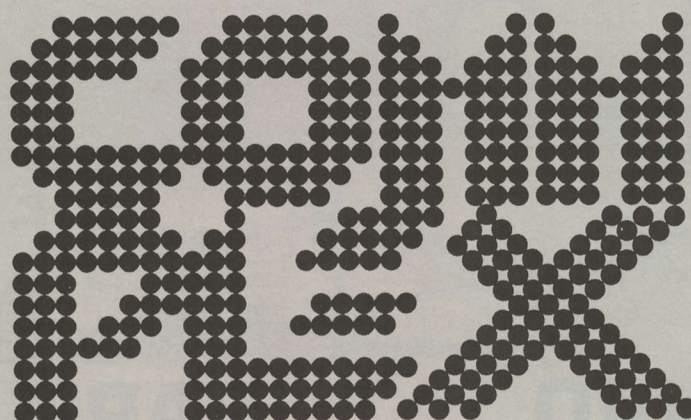
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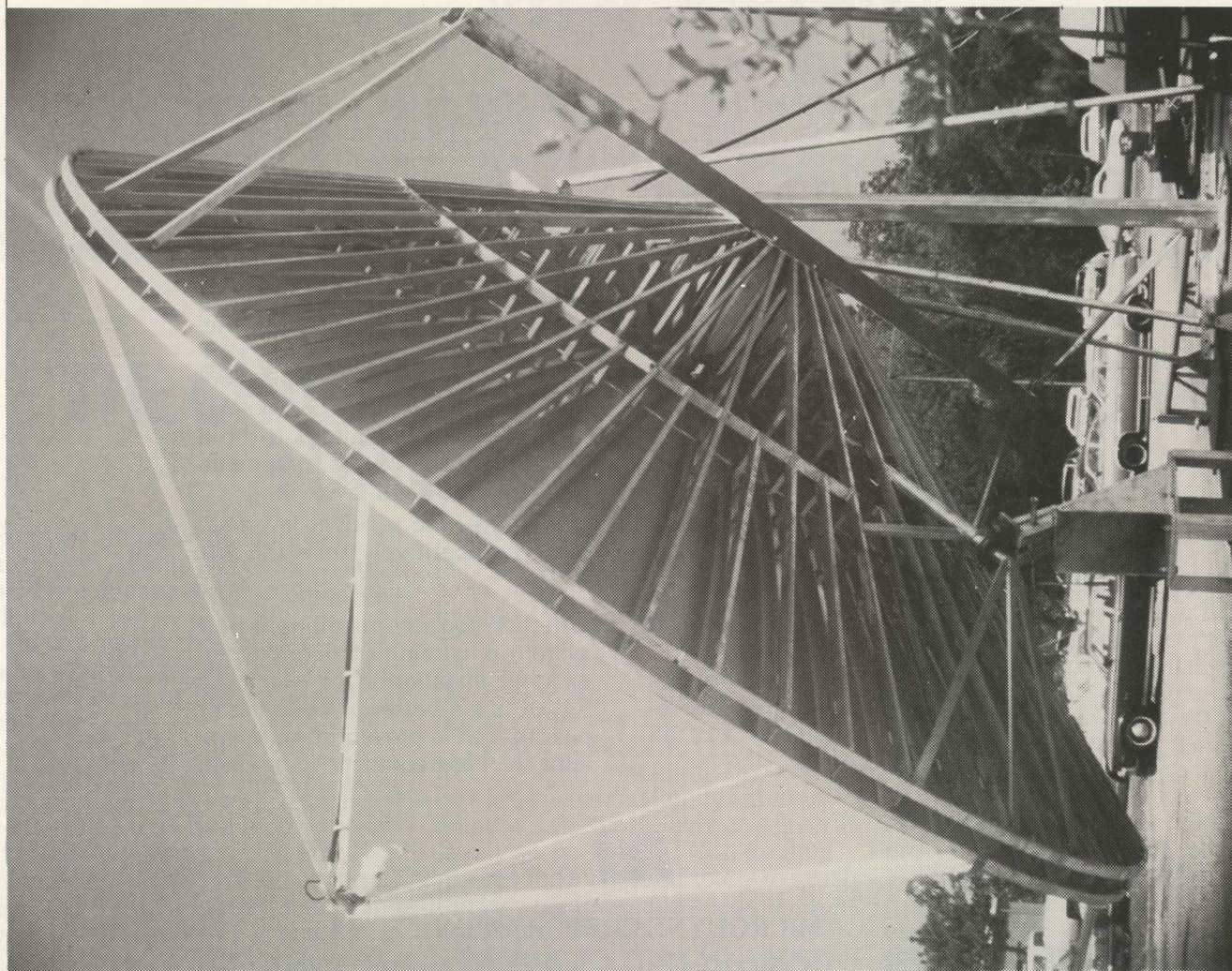
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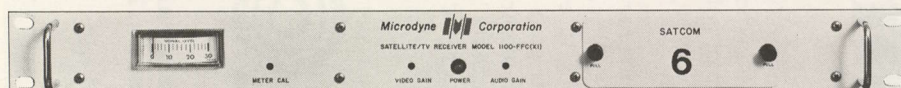


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17 SUPER STATION™

CANADA'S 'PIRATE OF PICKLE LAKE' HAS BUILT A THIRTY 'STATION' TV NETWORK WITH ILLEGAL TRANSMITTERS

It is not a revolutionary idea; but it may start a few revolutions. It's called television.

His name is David Brough (pronounced 'Bruff') and he professes he is having the time of his life. He is 33 years of age and "television is my business". To perhaps 50,000 people scattered throughout the Canadian northwoods he is a hero. To the Canadian government David Brough is a sonofabitch. To the copyright people he is a dark shadow passing in the night; they can't seem to locate him long enough to bring suit against him. To the Royal Mounted Police he is an embarrassment.

David Brough videotapes television programs. From the leading Canadian stations, and via a cable drop into his apartment in either Toronto or Ottawa, leading U.S. stations. Then he shares the videotapes with others. Possibly 50,000 others. Which sets him apart from the average videophile who may share a tape with a friend or two.

David shares his tapes by re-transmitting them through the public airwaves; which sets him apart from the guy who bicycles tapes through the mails or even the cable operator who plays tapes over a closed circuit non-ether transmission system. David Brough has been called the 'Pirate of Pickle Lake', and, 'The Backwoods Bootlegger'. The most amazing part of the David Brough story is that he is still walking around loose.

The Concept

David Brough started out his professional life as a teacher for retarded children in Orillia, Ontario. To David teaching others comes naturally, and he has the patience of Job. Later on he discovered television and began a short stint as a puppeteer for Toronto's CFTO-TV on something called 'The Uncle Bobby Show'. There he played trumpet and created funny shapes out of balloons and from his television experience he decided that television was a medium which could be better utilized.

He slowly evolved a concept. He called his concept 'The Northern Access TV Network' and he

envisioned a string of low power, community operated television broadcasting stations spread throughout the frontier areas of Canada. He saw each small community creating programming and he saw that programming being shared from community to community via videotape. On his own nickel Brough spent nearly five years trying to sell the concept to the Canadian Department of Indian Affairs and other government agencies. He got no place at all. He had hoped to round up government support for his project; to have the government fund some or all of the costs of bringing television to remote Eskimo and Indian villages. To Brough television, as a medium, was a natural tool to bring advanced civilization to these remote Canadians.

Initially Brough gave no thought to 'entertaining' the natives with typical southern Canada (or U.S.A.) programming. He felt, and frequently said, that to bring television into a remote Eskimo or Indian village and suddenly subject the natives to hours of Maude, Hogan's Heroes, The Fonz and Bob Hope might do more to 'shock' their culture than to enhance it. Brough planned to create programming for the natives, largely by letting them create it themselves with low cost equipment.

That's where he ran headlong into an ice wall at the CRTC; Canada's broadcasting watchdog. One communications official would later threaten to 'toss Brough out of a ninth floor window' while a CBC 'negotiator' would lose his cool and threaten Brough with physical harm. But that is getting ahead of our story.

The CRTC and the Department of Communications refused to allow Brough to get to first base. There was, through the Canadian satellite consortium Telesat, a 'policy' which allows communities with 500 or more people to have television via satellite. This policy requires the small communities to round up the seed money for a receive terminal, and to kick in nearly \$14,000 a year for maintenance of the terminal. For that the people in the small community receive a single channel of 'CBC

North' television via ANIK III. But even when the communities agree to the charges there is a long waiting time involved before the television is installed. And then the station, if it is expanded to include the ability to 'insert' local programming, must be constructed according to technical standards established by the CBC and the DOC for southern Canada.

"They want to use \$50,000 tape machines and \$20,000 color cameras; to employ transmitting stations that cost upwards of \$25,000 and to maintain the stations with fulltime licensed personnel. Can you imagine doing it that way for a remote community that has perhaps 200 people, or 50 people!!!" exclaims Brough. **"It is no wonder that these frontier communities still have no television!"** he adds with a note of sarcasm.

The more roadblocks the Department of Indian Affairs, the CRTC and the DOC threw before Brough the madder he became. **"After several years of trying to figure out a low-cost way to accomplish what I thought were the important goals of my program and still conform to their high priced notions of what a television station had to be equipped with and run like, I finally came to the realization that if it was going to be done, I had to do it myself."** But how? Without government backing and an alliance with the Department of Indian Affairs Brough had to look for other funding.

"I slowly, painfully, came to the realization that if there was to be any use at all of television for local expression and communication, it would have to be built on a foundation for which people were willing to pay money. I looked around and the only foundation I saw available was commercial television programming."

So Brough swallowed his pride, dismissed from his mind all of the carefully thought out arguments he had pieced together as to why commercial television programming should not

be a part of his Northern Access TV Network and he went to work.

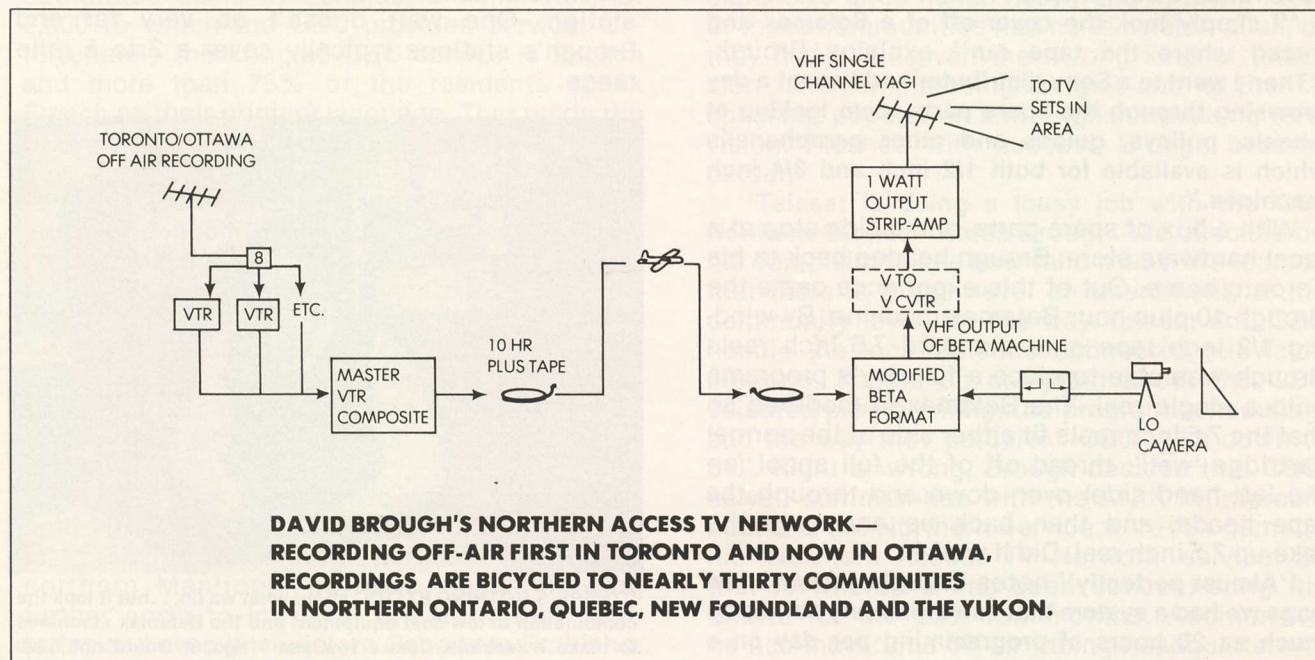
Tape It First

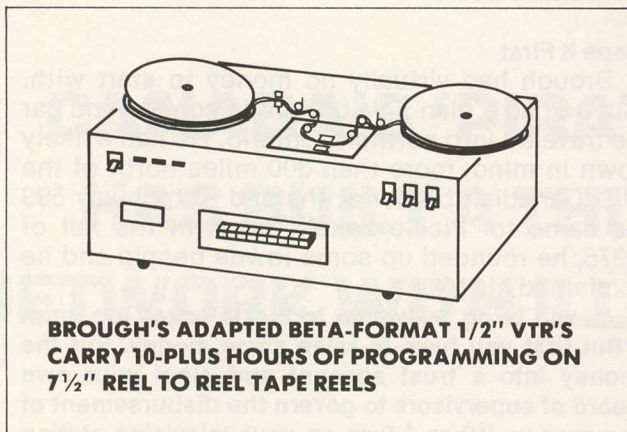
Brough had virtually no money to start with. But he had a plan. In a battered second hand car he traveled into northern Ontario. He had a likely town in mind; more than 300 miles north of the U.S./Canadian border at the end of highway 599 he came to 'Pickle Lake'. There, in the fall of 1976, he rounded up some towns people and he explained his plan.

"I will bring television to Pickle Lake" he said. **"But first you have to raise some money. Put the money into a trust account and elect your own board of supervisors to govern the disbursement of the money. When I turn on your television station and you are satisfied with the pictures, then you will pay me an installation fee. And each month you will collect a fee from the people in town who use the service and you will pay me a portion of that fee to continue supplying your TV station with programming."**

The fee was around \$10,000. Pickle Lake had 900 residents at the time, and a copper mine. it also had two bars and 200 television sets which the miners had brought with them from southern climes. A few of the miners were into videotapes sent up from the south but most of them drank alot and a few used their television sets to play pong games. The mining company that runs the town thought that television, via Brough, seemed like a good investment for the morale of their workers. And so they got behind the project.

At the time located in Toronto (although he has subsequently moved to Ottawa) Brough set about creating television programming for his 'Northern Access TV Network'. With a couple of Sony 3/4" inch U-Matic machines he began videotaping the best of the day's Canadian and





U.S. programming fare. A movie here, a sitcom there; he created his own week's schedule being careful to keep the popular sitcoms and other series shows rotating around at the same approximate time each week. But the time limitations on the Sony U-Matic machines was a problem (one hour per tape). He had agreed to provide a minimum of ten hours of new television per day and that meant ten separate one hour tapes each and every day.

So Brough did some engineering on his own. He admits he has no technical background, but those who have watched him at work seem to agree he does have a flair for understanding technology. "I reasoned that there were two primary problems with a 1/2" Betamax machine; it would not hold enough tape, and, the mechanical mechanism that carries the 1/2 inch cartridge tape into place, sets it into the operating position, and then takes it back out again after a tape has run is at best subject to a high rate of failure". The later was a concern to him; Pickle Lake had very few Betamax technicians (zero, actually) so he had to have reliable equipment.

"I simply took the cover off of a Betamax and traced where the tape ran" explains Brough. "Then I went to a Sony distributor and I spent a day browsing through the spare parts room looking at wheels, pulleys, guides and other paraphernalia which is available for both 1/2 inch and 3/4 inch machines."

With a box of spare parts, and a side stop at a local hardware store, Brough headed back to his Toronto home. Out of this experience came the Brough 10-plus hour Betamax machine. By winding 1/2 inch tape onto standard 7.5 inch reels Brough was able to place a full day's programs onto a single reel. The Betamax is modified so that the 7.5 inch reels fit either side of the normal cartridge 'well', thread off of the full spool (on the left hand side) over, down and through the tape heads, and then back up and onto the take-up 7.5 inch reel. Did it work?

"Almost perfectly" notes Brough. "After a few bugs we had a system that can ultimately handle as much as 20 hours of programming per day on a single reel".

That greatly simplified the tape transport and inventory problem for Brough. Since the tapes are 'mastered' by Brough in Toronto/Ottawa, converted to the 7.5 inch reel format and shipped via air into his communities he has to be concerned about such things.

Did we say communities, as in more than one community? Yes we did.

The Pickle Lake station went on the air just ahead of Christmas in 1976. Today there nearly thirty such 'stations'.

And The Broadcasting

At Pickle Lake, and more than two-dozen other frontier communities like it which are a part of the 'Northern Access TV Network', Brough employs a 'station manager'. At Pickle Lake the mining company provided Brough with an apartment to set up his equipment. The equipment, in new installations going in today, consists of:

- 1) A Brough-modified Sony Betamax 1/2 inch tape machine,
- 2) A vidicon camera and microphone,
- 3) A very elementary switching system that allows the 'operator' to switch back and forth from the tape deck to the 'live studio camera',
- 4) A 'strip amplifier' which produces a (more or less) 1 watt (RF) output power signal when driven by either the Betamax RF-TV channel modulator or alternately by a VHF to VHF channel converter which in turn is driven by the RF-TV channel output on the Betamax,
- 5) A sixty foot steel tower
- 6) A VHF yagi antenna cut to the channel on which 'Northern Access TV' broadcasts in that community.

The one watt VHF transmitters and the companion yagi antenna are situated typically where the whole community can be 'seen' from the station. One watt doesn't go very far and Brough's stations typically cover a 2 to 5 mile range.



"THERE'S NOTHING EXOTIC about what we do. . .but it took the combination of low cost equipment and the Betamax machines to make it feasible. Just a few years ago, it would not have worked."

This would be a good point to state that:

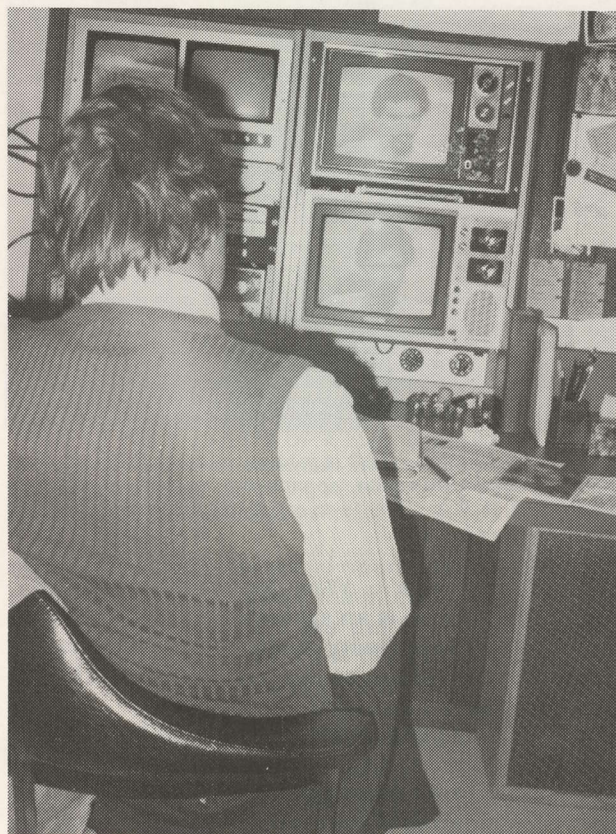
- 1) **Brough has nobody's permission** to be taping off-air U.S. or Canadian signals;
- 2) He has nobody's permission to be shipping the composite **broadcast day tapes** into nearly thirty Canadian communities for re-broadcast;
- 3) And, he has no permission or sanction from the Canadian government **to be operating VHF television transmitters** in nearly 30 frontier communities.

Seemingly Brough would have landed in the Canadian pokey a long time ago. Several individuals and quite a few government agencies have had a run at it.

Brough's **Pickle Lake** installation was very popular. So popular in fact that Brough was soon installing a second channel there and was up to a combined television broadcast day of 43 hours! People leaving Pickle Lake for R and R spread the tale of the Brough installation and soon the RCMP (that's **The Mounties** for the non-informed) paid a visit to Pickle Lake. The Mounties made a mistake; they let it be **known** they were in Pickle Lake to 'shut off the illegal TV station'. They were met by an large (estimated at 200) contingent of very angry miners who had planned their defense of their TV station at one of the local pubs. Faced with a sea of humanity carrying axe handles and uttering non-TV-type four letter words the mounties decided they had better rethink their plan and they left. Brough took this as a victory and he hit the road looking for more communities.

Longlac was one of the next towns 'activated' although within six months he had an additional six communities operating. His goal was "one new town per month" and today, some 27 months after it all started he is slightly ahead of that schedule. The next confrontation with the authorities came in Longlac; a community of 2,000 to which the CBC provides service. Unfortunately the Longlac CBC service is **English** and more than 75% of the residents speak **French** as their primary language. That made the CBC service less than popular and it opened a new avenue for Brough; French television for French speaking people. The mounties came to Longlac and confiscated equipment shutting the station down. The citizens rose in protest and made 'real' plans to dynamite the local CBC tower. That's when the Federal Minister of Communications, Jeanne Sauve, ordered the mounties out of Longlac and off of Brough's back. From that date forward he has been virtually immune to prosecution.

Having won two confrontations with the authorities Brough pushed his empire hard and fast; moving throughout northern Ontario, in northern Manitoba, northern Saskatchewan, further north to Inuvik in the Northwest Territories and even into eastern Canada to Frobisher Bay on Baffin Island and Labrador City in New-



PIRATE TO 'PIRATE' via videotape. While visiting at CATJ David Brough 'screens' the CCOS '78 interview with Canada's pioneer private TVRO operator Rod Wheeler of Whitehorse. The two have never met but their paths have crossed.

foundland. With each new town activated the bureaucrats at the CRTC and DOC squirmed more nervously and Brough became bolder.

His early towns were typically 'company towns' where the local mining, forestry, or whatever company paid his tab. They simply looked upon television service as a way of keeping their expensive hired hands happy and in town. Most of these communities had no television at all, or they had been given the 'wrong kind of television'; an example being Longlac and its French speaking population and English speaking television. Flushed with success Brough became bolder.

"Telesat is doing a lousy job with the **CBC Northern Service**" notes Brough. We checked on his complaint to see how valid it was. We learned that there is a high level of resentment, at the community level, for the way Telesat and CBC handle the local satellite connected television stations. People do complain about the CBC selected programming, the program scheduling, and the way they perceive "CBC talks down to us". Right or wrong, Brough decided that CBC-served communities with the ANIK III Interconnect and the Northern Service were fair game to his 'Northern Access TV Network' service. So that is where he has been concentrating his efforts for the past few months. Additionally, he has moved his off-air taping headquarters to Ottawa where he says "**I have the second French**



"WHAT I AM TRYING TO DO is recover my costs." Brough lives sparsely, almost incognito, spends the majority of his time taping and traveling. "This is an expensive business; plane fare to Inuvik is over \$1,000".

network available". Why is that important? "Northern Quebec is an area where I really haven't been able to expand very much, largely because of the existing coverage of the first CBC French network channel".

Most of Brough's programs bicycle around the full network by leaving Toronto/Ottawa and landing at his 'flagship station' at Ignace, Ontario for the 'first showing'. Then they make the circuit, via car, bus and bush pilot from one town to the next town. In each town a station manager operates the 'system'. In many communities Brough has shipped in large quantities of single channel yagi receiving antennas to make it possible for his 'subscribers' to get good pictures. "I charge just enough for the antennas to cover the wholesale price I pay for them plus the freighting costs" notes the young network tycoon. In the community the station manager is apt to be a housewife and the TV station is just as apt to be a corner of the kitchen. Brough encourages heavy use of the local origination camera. Many of the communities have regular 'talk shows' and virtually all use the "LO" facility an hour or more a day. Brough learned early though that for all of the public talk about 'providing a local television outlet for local self expression' that what the people really want is southern Canada/U.S. programming.

"We had a small boy bring in a puppy he had found in the street. The station manager stopped the tape and switched to him on camera and he described where he had found the puppy; and the station manager volunteered to hold the animal until the owner showed up". Five minutes later there was a knock at the door. Another youngster with another dog. The tape was again stopped and the scenario repeated. After an hour of this the TV studio had turned into a 'waiting room' with perhaps a dozen animals. And the phone was ringing.

"The next kid that brings a dog in there is gonna' have to answer to me". It was the town mean person. "And the next time you stop that gawd-damn machine to put some punk kid on there

with a mongrel he picked up in the street I'm gonna' come down there and punch you in the mouth". And so ended the LO experiment in lost dog reports. The kids were quick to catch on; they saw a friend on TV and they figured out the way they could get on TV was to go scare up a dog of their own. It later turned out that dozens of kids were out chasing dogs up and down the streets trying to catch one as a 'ticket to getting on TV'!

"I try to find station managers who have some vision and who can think for themselves" notes Brough. "Some of them are pretty smart. They'll program a whole night of horror movies on say Saturday and promote it all week with hand drawn signs they put up on the LO camera during tape changes and when we are off the air with programming."

Advertising?

Most of these communities have one general (Hudson Bay Company) store and one bar. There isn't much room for competition and that suggests that advertising is less useful here than it might be in the outside world. In one town a 'lady of the evening' wanted to buy time to 'promote her business'. "We pondered about that for awhile and then remembered the episode with the dogs. We have considered rounding up several competitors in that field and bringing them in for a 'talk show'" smiles Brough. "Only I'm not sure how the married women in town would take it." Apparently 'ladies of the evening' are not married in the far north.

When there is no company-town atmosphere Brough calls a meeting in a new prospective community and lays out his plan. A citizens committee is formed and the local committee collects an equal share per household for the installation. Say \$30 per house or whatever it takes to make up the typical going-in costs of \$6,000. The same committee also collects the monthly fee, which is typically in the \$5 to \$10 per home range. They pay Brough once per month and he pays his expenses and his station manager. A Canadian reporter noted that Brough is obviously not getting rich with his network. A CBC official added "I have to hand it to David. . .he could be lying on a beach in Hawaii soaking up the sun, a rich man. Instead he's staying in there charging a low fee and giving lots of service".

When the mounties lost the battle of Pickle Lake and again at Longlac the CBC decided it had better try to improve its own image. So they brought a CBC service into Pickle Lake; Brough's first town. The mining company cancelled Brough's contract and booted him out of his apartment-station studio. That shut the station down, but only for a month. The towns-people watched the CBC for a few weeks and decided it was not up to Brough's quality (or quantity). So they formed a local committee, found him an old trailer home to locate in and put him back into business in Pickle Lake. That was in December

of 1977 and that experience gave Brough the 'head' to tackle other CBC communities served via the CBC-North Anik link. In the summer of 1978 he went as far north as you can go; to Inuvik which is almost as far north as Barrow, Alaska. Preliminary results were not good but Brough went ahead. Sixty-six families signed up for the initial \$30 installation charge and \$10 a month. Brough is optimistic however. **"Now that we are into the twenty-four hour per-day night period up there I think we'll see much higher penetration before summer comes again"**.

Brough likens his approach to that of PBS. **"We stand there with our hat in our hand; the communities must have faith in us, and we must have faith in them. In some communities it works and in others it does not."**

And when it does not?

"Sometimes we have to shut the station down for awhile. Usually not long though; because people know why and there is peer pressure on the freeloaders to pay up."

In some communities, where he is showing 'profitability', Brough has upgraded the LO system to a 'low cost' color camera. **"I have had very good luck with the \$1500-\$1800 vidicon color cameras. They work surprisingly well, are almost foolproof to use, and they take a beating. It's just another area where we can be cost effective while the CBC has to come in with three-plumbicon cameras and two technicians to keep everything running."**

Cost effective equipment use bears some additional discussion. The Brough-modifications to the 1/2 inch Betamax decks are of course the key to the viability of the network. **"In addition to using 1/2 inch tape wound onto 7.5 inch reels, I am also using a slightly higher grade industrial tape. It is around 1/3rd thicker than standard Betamax tape. With a normal Betamax tape I believe you can count on seeing dropout from oxide flecking by the 50th pass region or even sooner. We find the heavier tape is good for 1,000 or more."**

"Sony says the playback heads should be good for 1,000 hours before replacement. That's nearly



"MODIFIED BETAMAX MACHINES work fine. With this approach we have been able to go into communities far too small to serve any other way." Brough has more than 40 of the 10-hour-modified 1/2 inch format machines now in service and adds a couple more each month.



"ONE OF THE ELEMENTS OF A copyright damages suit is to prove they have been damaged. The other element is to sue somebody who has something to collect. I do have a five year old, second hand van, about half paid for. . ."

three hours a day in normal operation for a year; but here we are using these machines 20 hours a day on the average. I find we get between four and six months use out of a set of heads and then we simply replace them and go on (that works out to between 2,400 and 3,600 hours; perhaps Brough can do a testimonial for Sony. Can't you just see it. . . 'Canadian One-Man Television Network Says Sony Betamax Machines Make His Illegal-Network Run Smoothly!').

Speaking of 'illegal'; what about the copyright folks?

Canadian copyright law is murky when compared to U.S. law. And because the Canadian government is so high on increasing the percentage of the broadcast day devoted to 'Canadian content' (versus U.S. content) there is some reluctance on the part of Canadian authorities to push hard on people 'stealing U.S. product' in this area. Brough has a bottom line on copyright.

"I haven't been sued. ." and he adds thoughtfully **"...yet!"**

On one occasion, this past fall, the Canadian program owners did send an attorney to a CRTC hearing to complain about Brough's 'illegal use' of their product. Brough says he has had **"several fruitful discussions"** with the Canadian group that represents the major film agencies. At least they are talking.

Brough feels that with Canadian content on television, radio and in the print media increasing all of the time the day may be coming where the theater owners will next be hit. **"I actually would expect the Canadian government to try to impose restrictions on how much time theaters can devote to non-Canadian movie productions"** adds Brough.

Brough says he is willing to pay a **"reasonable fee"** for copyright although he would also like to get out of the tape business if there were an alternative. **"One of the ways to nullify the copyright program is to go 'live' with my programming at all of my communities"**. He's talking about satellite distribution; a subject we'll return to shortly.



"BEFORE CBC STARTED WITH ANIK they were doing something very similar to what I was doing. Only they could only manage four hours a day and black and white cameras and programs". Dozens of far-northern 'communities' still remain without service of any kind.

"If my systems were merely translators, being fed by microwave and merely repeating in real time the programs originated someplace else, I'd pretty much be out of the copyright circle. What puts me into it is my taping of the programs. I have to physically transport them and that is where I am vulnerable".

But for now Brough seems to be avoiding the copyright problem; at least it hasn't landed him in court to date.

Brough's visibility is hardly low however. He is frequently interviewed on the CBC, both television and radio. "I think the CBC keeps doing interviews with me in hopes of putting me down. They like to ask questions like 'What about the fact your transmitters are illegal?', or, 'Why are you doing this and holding these poor people at ransom?'. I tried to buy commercial advertising time on the CBC to reach the north and they said 'no', they would not sell it to me."

Apparently the CBC put-down exercise has not been very successful. Brough says most of his new communities 'come to him' and most of these come as a result of his exposure on CBC radio or television. "In trying to dis-credit me, they provide me with the best advertising I could ask for. I always seem able to work into the interviews that we provide 25 or more movies a week, that we have multiple channels of service, and that we average twenty hours per 'broadcast day'. When people in CBC-served-communities hear or see this they compare it against the three or four movies they get a week and the 10 hours or so a day of television and they just naturally get incensed."

Brough also suggests that the CBC doesn't do itself any favors in the frontier areas by sending in pre-packaged, automated ANIK fed terminals. "They come in here with highly paid engineers and install the station. Then they leave it there, running unattended like a white elephant stuck in the town square. There is no local input to the station, no new local employment. It's as if Toronto was talking to them via a robot. People resent that". Brough takes the opposite approach. He hires local people to run the station, gets local people

involved in the local origination programming, and has the majority of the community behind him.

"I have certainly cheesed-off an awful lot of people in the government".

Brough cannot be faulted for not having tried to do it another way. "I spent nearly five years knocking on doors, visiting bureaucrats, and trying to point out to them that they were spending too much money to do a job that could be done for far less money and with far better local support. I finally decided, out of frustration for the way the system would not respond to the real-world needs, that the only way to get the system changed was to go out and do it on my own. I did this and now, finally, there are signs that my work is producing some results".

The signs are there. Last October, in a series of CRTC hearings held in Thunder Bay (near Duluth for you Yankees reading this) the CRTC investigated two things dear to David Brough's heart. First they took testimony on a proposal that would authorize something called 'Flea Power Broadcasting Stations'. The decision, not yet formally announced, was to authorize 1 watt transmitter stations (like Brough's) provided they met several sets of criteria:

- 1) Maximum power output permitted is 1 watt.
- 2) Maximum antenna height of 100 feet (AAT).
- 3) Certification by a recognized professional engineer that the station configuration would be technically sound.
- 4) Maximum antenna gain of 12 dB.

A 100 foot antenna provides a radio-line-of-sight to 15 miles while 1 watt into a 12 dB gain antenna (not including transmission line losses) creates an ERP of about 15 watts.

There are other technical parameters but none that seem to worry Brough. He feels his Betamax fed stations will be licensed just as soon as the paperwork can be cleared. There is a two-pronged application technique here. The license must be approved by the CRTC (for a station license, under the guise of answering the question 'Is the station in the best interests of Canada?', and, a DOC license or permit which



"TAPES ARE flown or driven into the 30 communities every week. When a town is 'weathered-in' and the tapes don't show up, the phone rings off the hook at the station. At least we know people are watching!"

covers the technical parameters of the proposed station).

So after 27 months of being a pirate, David Brough is about to become legitimized. That should give him a firm foundation to grow on. It may even help him solve some of his perpetual money problems. **"One of the real handicaps we have been operating under is my inability to even borrow operating funds. Can you imagine how a banker reacts when you walk in and ask to borrow money to build an illegal television broadcasting station!"**

Well, you can take the pirate label off of David Brough but perhaps you can't take the pirate blood out of David Brough. He has two new plans cooking and both of them are lining him up for new battles.

At the same CRTC hearings in Thunder Bay the subject of satellite delivered signals to cable systems came up. Brough also broached the subject for his newly 'legalized' Flea Power TV Stations.

"I blame the CBC again for this. They have been running documentaries about how wonderful satellites are; how they (the American satellites in particular) have all of these wonderful (cable feed) services on them. My communities see these programs and the people start asking me why I don't have satellite terminals installed to bring in 'Super 17' or WGN or something else."

Is Brough seriously thinking about putting in a satellite terminal for his Flea Power stations?

"I tell my communities, 'Hey, I'm on thin enough ice already with my tape fed stations. What are they going to do to me if I start stealing American satellite signals?'" He admits he would like to try **"at least one"** and he notes he recently acquired some surplus ten foot dishes.

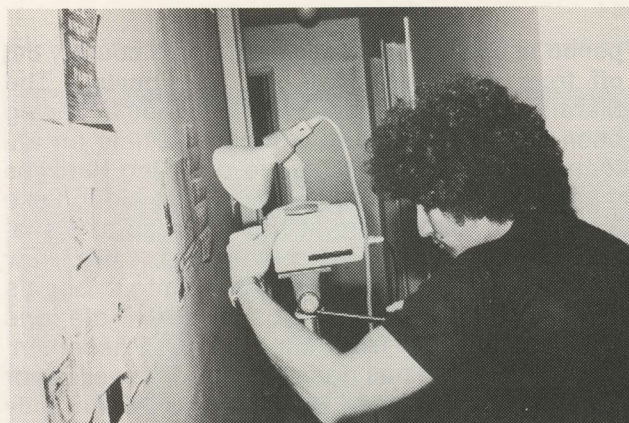
And if he does, what does he expect to happen?

"I don't think they (the CRTC, DOC and the mounties) really have any way to stop it. If there is a legitimate need for the service, and it is there, and someone is willing to spend his own money to get it. . . I just don't see it being any different than my risking every cent I had to put in the first station at Pickle Lake"

Which brings us to the other CRTC hearing topic 'near to David Brough's heart'. Several of the cable systems located along the northern shore of Lake Superior applied to the CRTC, at the Thunder Bay hearing, for 'permission' to install privately owned TVRO terminals and to pick off U.S. satellite signals. A committee is studying the applications; some expect action about the time you read this. Others suggest they will study it for a long-long time.

Brough figures that even if there is approval of privately owned TVRO terminals in a use area that does not directly include the 'feeding' of his low powered television stations, he'll decide **"that is close enough"** to get him started. And if it is not approved?

Well, **"I still remember how the townspeople turned out in Longlac and Pickle Lake when the mounties came. It could happen again."**



"WE TRY to get the community itself involved in the operation of the 'TV station'. Local origination is a must. People feel better about themselves when they participate".

Brough's Threat To Cable

"I plan to push the CRTC to allow me to encode my signals. Up in the northern areas, where we have lots of frequencies and virtually nobody using them, I look upon our service as 'cable TV without the cable'. I already have two channels in operation in several areas. But there is always the problem of collections. So if I encoded the transmissions, I'd have a way of improving my collection, improving the flow of money, and be able to do more for the communities"

Brough has already contracted for an encoder/decoder development program. They have prototypes working utilizing a pair of carrier oscillators that fall into the TV passband to mess up the signal; very similar in concept to the TEST package marketed here in the states.

"I'd like to provide a community with five, adjacent, channels. Two of the channels would operate without encoding. One would be a local community channel and the second would be an educational channel. Anyone with an antenna could receive those signals. Then on the other three channels I'd provide a mixture of U.S. and Canadian programming, on tape or via satellite and I'd encode these channels. People would rent the decoders from me for the same fee we now charge for one or two channel service; or perhaps a tad more. Just by picking up our penetration percentage of people paying we'd be able to expand in this way."

The concept would not work, at least in the VHF band, in the states or southern Canada because of the proliferation of VHF off-air channels. But in the far north of Canada, where there is no service in this spectrum, it just might fly.

"Our concept is to simply duplicate, in approach, what cable TV is doing except do it without the expense of cable." Is that as close as Brough gets to the cable industry? No, not quite.

At the Thunderbay CRTC hearings Brough tendered an application to install a 'Flea Power' system in a cable TV town. **"Until now I have stayed away from cable communities although I have, honestly, been approached by several communities where cable operates."** The town is Marathon, Ontario which David Brough characterizes as **"A perfect example of what has hap-**

pened to smaller cable systems in this country cut off from dependable U.S. off air signals". The Marathon system goes way-way back, having been the subject of an extensive article on antenna design in a 1960 issue of **DXing Horizons** magazine. Like many systems strung along Lake Superior's north shore, it has suffered as Canadian stations (both primary and so-called low power repeater) have encroached onto channels it was using to pull 200 plus mile VHF stations across the water from Michigan or Wisconsin. U.S.A. reception has gone from poor to very poor through the years and Brough feels "Either they let systems like this import WTCG via satellite from SATCOM, or, they let me in there with Flea Power VHF transmitters fed with Betamax tape machines.

One way or the other the people in these communities are going to get American television that is reliable, and of reasonably high quality."

David Brough is a maverick. At 33 years he says he has led a very full life; one he would not trade for anything else he can imagine. "I have made it very clear to people that I am just a 'squatter'. Nobody else wanted the territory I have moved into; nobody else seemed to care to work out a way to provide a cost-effective television service to these people. I haven't made any money out of it yet and perhaps I never will. But I think I could, especially if I can get into the satellite circuit and start encoding service channels in my communities. All of the elements are in place for a successful business here."

War Of The Indies

WTCG/WGN/KTVU - THE BATTLE FOR SUPERIOR SUPER STATION MOVES TO HIGH GEAR

Three (more or less) full-time indie signals are now available on SATCOM F1. WTCG, celebrating its second birthday 'on the bird' this past December is pushing for a 4 million cable home goal before January of 1980 rolls around. Chicago's WGN, long a 'favorite' via terrestrial microwave in the upper midwest, is pushing for the one million homes via satellite mark and San Francisco/Oakland's KTVU, a popular indie in the northwest and along California's frontier, is heading for the half million mark.

What makes these three indies so special? Is their programming that unique that they command larger audience shares than 'traditional' indies? Why, for example, does WGN boast that it is "the highest rated indie in the country", and get away with it? What about the stations themselves; who are not required to grant permission to the common carriers who carry their signals hither and yon? Are they 'happy' with the additional cable coverage?

Far more important to cable operators is the station programming. Indies program primarily for their own local areas; their program selections and the placement of the programs into the rigid 24 hour local time zone schedule reflects those programming decisions. How well does "The 8 O'Clock Movie" from San Francisco play in Arlington, Virginia at 11 PM at night? Or SEC (Southeastern Conference) basketball, telecast in Atlanta, play in Idaho?

Of the three indies now on the bird more or less full time (the KTVU bird schedule is chopped up twice during the day by the common carrier; a point we'll return to), only one of the stations has an aggressive marketing program designed to help the cable system operator 'sell' the service in his town. That station is, of course, Ted Turner's WTCG. Turner's staff provides everything from pre-release program schedules to co-op advertising support and a steady stream of newspaper advertising layouts, news stories, and other support literature. WGN's attitude is more progressive today than it was before they got onto the bird this past November but to date they been primarily content to send out program schedules to affiliated cable systems. KTVU has no official view on cable carriage via satellite. Significantly, to get a program schedule for KTVU it is necessary to go to the common carrier bringing them up on the bird; the KTVU offices say "sorry, we cannot do that. . .".

WTCG, for the record, is owned by Turner Communications Corporation; Ted and a few friends (none with more than 3% of the stock). WGN is owned by the Chicago Tribune. They have interlocking interests in New York's WPIX (another indie), own Duluth's KDAL (a CBS affiliate) and Denver's KWGN (another indie). They are also a group owner of CATV systems. KTVU is owned by Cox Broadcasting Corporation which owns Atlanta's WSB (NBC), WHIO Dayton (CBS), WSOC Charlotte, WIIC Pittsburgh (NBC), and a large col-

lection of CATV systems (one of the top MSOs). Significantly, perhaps, the corporation with the largest TV broadcasting interests and the widest collection of cable systems (i.e. Cox) shows the least 'interest' in promoting their station as 'super medium' while the corporation with the smallest direct broadcasting interest (Turner) holds down the opposite end of the spectrum.

Comparison One - Time Available

Turner's WTCG is on the air 168 hours a week. That's all there are. All 168 hours are available via satellite.

WGN is on the air between 153 and 154 hours per week at the present time; averaging just under 22 hour per day. All of their hours are available via satellite.

KTVU is on the air between 137 and 138 hours per week, but a portion of their 'broadcast' day is deleted by the common carrier. They end up on the bird with their own programming between 110 and 111 hours per week or an average of around 15.75 hours per day. We'll come back to the balance of the transponder 1 satellite programming day later on.

Comparison Two - Movies

Not every week is the same of course. We sampled programming weeks in early February and developed an average of what follows:

- 1) **WTCG** — ran **39 movie titles** in our sample week; that works out to **5.57 movies per day**.
- 2) **WGN** — ran **20 movie titles** in our sample week which averages out to **2.86 per day**.
- 3) **KTVU** — ran **22 movie titles** in our sample week which averages out to **3.14 per day**.

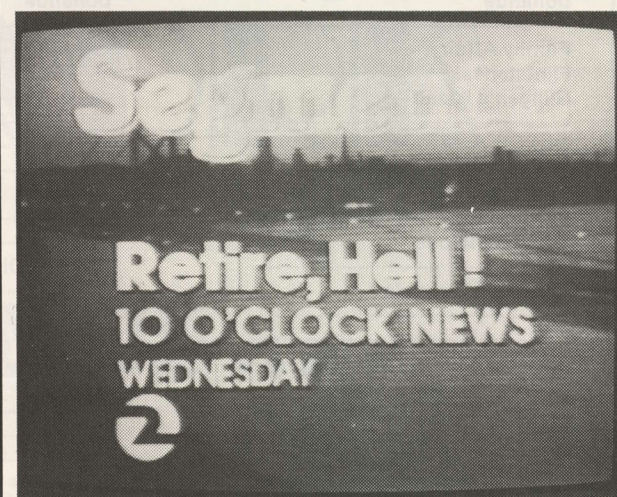
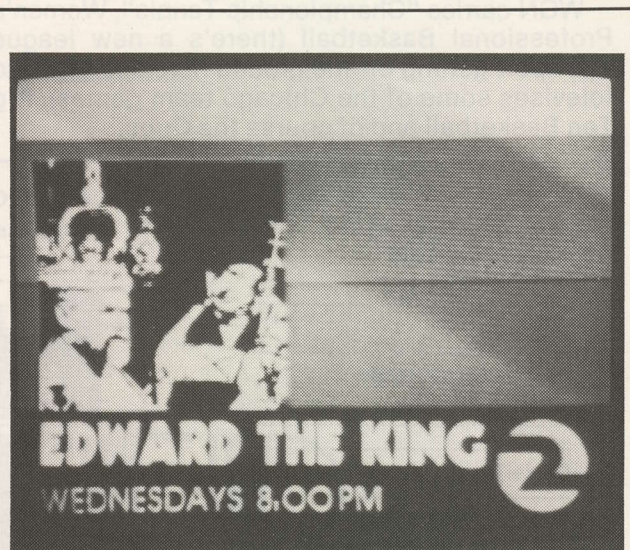
Every television station likes to boast about the quality of its movies. This is one of those grey areas where individual preferences distort hard measurements. In the weeks we averaged we found that:

- 1) The average vintage of a **WTCG** movie was the year **1956** (.5135). That was for 39 showings, 2 of which had no release year specified and which were not counted.
- 2) The average vintage of a **WGN** movie was the year **1953** (.2075); that was for 20 showings.
- 3) The average vintage of a **KTVU** movie was the year **1955** (.7000); that was for 22 showings.

Oviously age does not mean everything. WGN runs a movie classic on Sunday evenings ("When Movies Were Movies") and many are 1930'ish releases. The most recent movie in the batch was a 1975 release on WTCG ("Death Scream", a 'TV adaptation'). It is worth noting that in WTCG's case there was only one movie prior to 1950 (1939) but a very heavy concentration of early 50 releases. WGN's tended to be either in the early 60's or in the 30's. KTVU's were better spread with no big groups anywhere in the span which started in 1934 and ended in 1971.

Comparison Three - Sports

All three stations carry a relatively heavy sports schedule. However the mix changes from year to year so an exact comparison for the 1979 'season' is difficult to come by.



KTVU PROGRAMMING has that 'refined' San Francisco area touch; local news is frequent winner of broadcast journalism awards. PI advertisements are the same nationwide.

The heaviest schedule of all is the WGN coverage of Chicago Cubs baseball; now up to 142 games per year. However WTCG's coverage of Atlanta Braves games is coming up each year and during 1979 they'll be seen in 101 games.

WGN carries "Championship Tennis", Women's Professional Basketball (there's a new league and sport getting off the ground here and Chicago televises some of the Chicago team games), Big Ten Basketball and of course the Cubs.

WTCG packages something called "Georgia Championship Wrestling", a syndicated wrestling package originated by WTCG. They run it twice on weekends; both the new program for the week and a "Best of ..." repackaging job. They also

SYNDICATED PROGRAMMING COMPARISON

WGN/9/Chicago
Abbott & Costello
Andy Griffith

Bewitched

Carol Burnett/Friends
Cisco Kid

Daniel Boone

Dick Van Dyke Show

Donahue

Family Affair
Flintstones
Gilligan's Island

Hee Haw

Hogan's Heroes

I Dream Of Jeannie

Lawrence Welk

Lone Ranger

Love American Style

My Three Sons

New Adventures Superman

Odd Couple

Soul Train

Star Trek
Tarzan

Twilight Zone
Wild Kingdom

KTVU/2/San Francisco-Oakland

Big Valley

Cross Wits

Dating Game

Donahue

Hee Haw

Hot City Disco

I Love Lucy

Love Experts

Odd Couple

Romper Room
Room 222

Soul Train

Spiderman

Tarzan

The Rookies

Tom and Jerry Show
Truth Or Consequences

Woody Woodpecker

WTCG/17/Atlanta

Andy Griffith
Beverly Hillbillies

Carol Burnett/Friends

Cliffwood Avenue Kids

Dolly Parton

Dragnet

Flintstones
Gilligan's Island
Good Old Nashville Music
Green Acres
Hazel

Hee Haw Honies
Hogan's Heroes

I Dream Of Jeannie
I Love Lucy
Juke Box
Last Of The Wild

Leave It To Beaver
Little Rascals

Lost In Space
Love American Style

Marty Robbins
Maverick
Mission Impossible
My Three Sons
Nashville On The Road

Night Gallery

Partridge Family
Pop Goes Country
Porter Wagoner Show
Rock Concert
Romper Room

Sanford And Son

Space Giants
Speed Racer

Star Trek

The Lucy Show

Three Stooges

World At War

Note: bold face indicates match-ups.

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carry SEC (Southeastern Conference) college basketball, Atlanta Hawks basketball, Atlanta Flames hockey, Atlanta Braves baseball, Atlanta Falcons (pre-season) football and some tennis.

KTVU telecasts Warriors basketball, Giants baseball and some tennis. All three stations carry various off-network sporting events such as the Tangerine Bowl and others that don't make it to "the big time".

Comparison Four - Syndication Programs

Perhaps the most surprising thing about the syndication program area is the degree which the three stations do **not** overlap. Because there are only a handful of extremely popular (i.e. Donahue, Hee Haw, etc.) syndicated programs available it **seems** that virtually every station market runs about the same set; especially in the morning and early evening periods. But, once you name the top five to eight syndicated 'hits' you find there is a much larger group immediately below the leaders and given the different programming tastes of the markets and station program buying personnel it quickly becomes evident that **duplication is almost the exception; not the rule.**

We have prepared a chart which shows how much duplication there is. If you have 'syndicated exclusivity' problems you can use this chart to compare the satellite indies against your local market syndicated shows to determine which shows you might have to 'yank' to 'protect' the local stations. Listings are alphabetical for ease of comparison.

There is a total of 66 programs; WTCG has 39 (59.1% of all listed), WGN has 25 (37.9%) while KTVU has 18 (27.3%). In the match-ups, only 15 appear on two stations (24.24%) and none appear on all three. Who matches who most often?

- 1) **WGN and WTCG** - 13.6% of the syndicated shows duplicate
- 2) **KTVU and WGN** - 6.1% of the syndicated shows duplicated
- 3) **WTCG and KTVU** - 3.0% of the syndicated shows duplicate.

During the programming day there is only one instance of the same program being on two (indie) stations at the same (real time) point; Andy Griffith appears on WGN and WTCG simultaneously. However, Flintstones, Gilligan's Island, and, I Dream of Jeannie is offset by only thirty minutes in the late afternoon period on WGN and WTCG with it coming up first on WTCG in each case (see sample day program schedule illustration here).

Comparison Five - News

Both WGN and KTVU build their daily "big newscasts" around the 10 PM (local) time slot. With the two hour time difference, however, they are two ships passing in the night.

Chicago's Jack Taylor News is well rated in the market and it runs 30 minutes, seven days a week. San Francisco's 10 O'Clock news lasts an hour (while WGN's is a 30 minute telecast).

Ted Turner's approach to news is like Ted Turner's approach to everything else; "different". He typically schedules a couple of five minute "Up-dates" during the day (11:55 AM and 2:25 PM eastern) and then he saves their "big" newscast until around 3:10 or 4:10 or whenever the movie is over. **That's AM not PM.** Turner's Bill Tush creates newscasts that are someplace between a college fraternity party gag and the Soupy Sales Show. Tush reportedly has a fan club and for those far enough west to catch his news at a decent hour it certainly provides an interesting way to end the day. It's hard to go away from a Tush newscast feeling unhappy with the state of the world. You probably won't know anymore about the world than when you sat down, but you won't head for the bathroom while he's on either.

Statistics tell part of the story: in our sample average week WGN carried 635 minutes of news, KTVU 360 and WTCG 150.

In the public affairs department KTVU is probably the hands down winner. It devotes most of its Saturday and Sunday morning periods to television programs designed for both minority groups (Japanese, etc. in the Bay Area) and religion. WGN does an 'acceptable' amount of this also; largely from 7:15 to 9:30 (CST) on Sunday morning and briefly on Saturday morning. WGN also does something rather strange on most Saturday nights; from 7:30 PM to 8 PM they schedule a locally produced program called 'People To People'. It may have a wide following in Chicago-land but for it to play in early prime time is something of a mystery even with high ratings.

WTCG...approaches non-news public affairs like it does the news. Turner has a program called 'Open Up' scheduled for two hours starting at 11 PM eastern every Sunday night. The host is usually Bill Tush and the danger of sitting down and watching this program is that you won't get to bed on time. Tush has a particular knack for finding interesting people to bring on camera. Turner also creates around one 'public affairs special' per month on a wide variety of subjects, including topics such as abortion, public housing fraud and so on.

Comparison Six - The 'Look'

Each of the three indies are taken 'off-air' some modest distance from the broadcasting antennas. Most are then carried on to the actual satellite uplink transmitter via terrestrial microwave.

(SSS has requested permission to 'patch into' the video/audio boards at WTCG but to date the FCC has not acted on this.)

There is a difference that the eye can detect between the three signals. WTCG has virtually no visible impairments; on very rare occasions you 'think' perhaps you can see a very low level trailing ghost on a good quality video monitor but by the time you get around to trying to measure it, it is gone. WTCG is of course a UHF signal which means it has to pass through a UHF



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transmitter on its way to you. This is perhaps the weakest link in the WTCG chain. On occasions the transmitter shuts off but with one exception back nearly two years ago it seldom stays off more than a couple of seconds.

The WGN signal is taken off the air in the Chicago metropolitan area. Original plans to take it off air in the vicinity of the Lake Geneva, Wisconsin RCA uplink site were abandoned when it became apparent that some co-channel interference was likely an objectional period of the time. WGN has a small trailing ghost that almost never completely disappears but it seldom can be seen except on close inspection on a good sized monitor. It's far enough down that it takes a slide with large printed letters or a super against a vivid color background to be noticed. To date the WGN signal has been very

reliable although on a couple of occasions the terrestrial microwave link (which reportedly has a checkered history as a microwave link) does act up for brief periods. WGN is a high band VHF signal.

KTVU has the most off-air problems of the three. Being the lowest VHF channel we have available, it is susceptible to a variety of problems including ionospheric interference, ignition notice and less than acceptable off-air equipment flatness (from antenna to the demodulator). Apparently somebody delights in flying a sizeable airplane through the path **between** the transmitter and the off-air pickup point because noticeable (although not objectionable) amounts of airplane flutter are evident from time to time. Some systems have said that the 'color' on KTVU is not up to the

EST	CST	MST	PST	WTCG - CHANNEL 17 ATLANTA	WGN - CHANNEL 9 CHICAGO	KTVU - CHANNEL 2 OAKLAND/SAN FRANCISCO
Midnight	11 PM	10 PM	9 PM	OPEN UP (Starts 11:00 PM EST)	WGN MOVIE (Starts 11:30 PM EST)	8 O'CLOCK MOVIE (Starts 11 PM EST)
12:30 AM	11:30 PM	10:30 PM	9:30 PM	(SAME)	(SAME)	(SAME)
1:00 AM	12 MID	11 PM	10 PM	PLAYHOUSE 17 (Movie)	(SAME)	10 O'CLOCK NEWS
1:30 AM	12:30 AM	11:30 PM	10:30 PM	(SAME)	(SAME)	(SAME)
2:00 AM	1:00 AM	12 MID	11 PM	(SAME)	NEWS (2:18-2:48 EST)	LOVE EXPERTS
2:30 AM	1:30 AM	12:30 AM	11:30 PM	(SAME)	THE CROMIE CIRCLE (2:48 EST)	THE ROOKIES
3:00 AM	2:00 AM	1:00 AM	12 MID	PLAYHOUSE 17-II (Movie)	(SAME)	(SAME)
3:30 AM	2:30 AM	1:30 AM	12:30 AM	(SAME)	(SAME)	OFF AIR
4:00 AM	3:00 AM	2:00 AM	1:00 AM	(SAME)	LAST REPORT/NEWS (4:18 EST)	OFF AIR
4:30 AM	3:30 AM	2:30 AM	1:30 AM	(SAME)	OFF AIR	OFF AIR
5:00 AM	4:00 AM	3:00 AM	2:00 AM	DRAGNET	OFF AIR	OFF AIR
5:30 AM	4:30 AM	3:30 AM	2:30 AM	WORLD AT LARGE	OFF AIR	OFF AIR
6:00 AM	5:00 AM	4:00 AM	3:00 AM	(SAME)	OFF AIR	OFF AIR
6:30 AM	5:30 AM	4:30 AM	3:30 AM	ROMPER ROOM	NEWS (6:50 AM EST)	OFF AIR
7:00 AM	6:00 AM	5:00 AM	4:00 AM	THREE STOOGES/ LITTLE RASCALS	NEWS, AGRICULTURE REPORT	SPN - MALONE'S BREED
7:30 AM	6:30 AM	5:30 AM	4:30 AM	(SAME)	CARTOONS	FINANCIAL SURVIVAL (SPN)
8:00 AM	7:00 AM	6:00 AM	5:00 AM	LEAVE IT TO BEAVER	RAY RAYNER/FRIENDS	CELEBRITY (SPN)
8:30 AM	7:30 AM	6:30 AM	5:30 AM	HAZEL	(SAME)	(SAME)
9:00 AM	8:00 AM	7:00 AM	6:00 AM	THE LUCY SHOW	(SAME)	HEARTBEAT (SPN)
9:30 AM	8:30 AM	7:30 AM	6:30 AM	GREEN ACRES	I DREAM OF JEANNIE	FRAN CARLTON (SPN)
10:00 AM	9:00 AM	8:00 AM	7:00 AM	MOVIE 17	MORNING MOVIE	CARTOON TOWN
10:30 AM	9:30 AM	8:30 AM	7:30 AM	(SAME)	(SAME)	(SAME)
11:00 AM	10:00 AM	9:00 AM	8:00 AM	(SAME)	(SAME)	(SAME)
11:30 AM	10:30 AM	9:30 AM	8:30 AM	NEWS - 11:55 AM EST	(SAME)	ROMPER ROOM

same 'snappy look' of WTCG and that may be a valid observation. On the other hand, **what** channel 2 off-air signal **does compare** with a high signal level off-air UHF signal? The problem is with the operating frequency, if there is a problem; not the off-air gear. It will be interesting to see if the KTVU signal is sufficiently strong to override the inevitable off-air ionospheric interference that we will come into this spring and summer. If it gets through the summer season with no signs of co-channel interference somebody should be given a medal for their work in designing the off-air pickup antenna system.

General Viewing Impressions

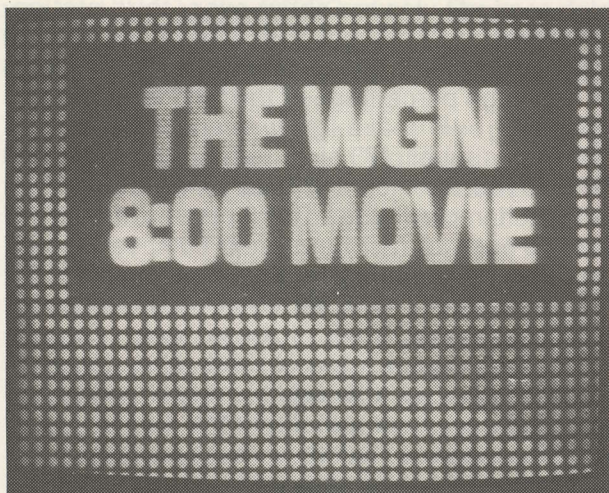
Both WGN and KTVU try hard to remind you (often) that they are 'local' to their viewing areas. In spite of the fact that both have been feeding into terrestrial microwave links that carry their signals far beyond their Grade B zones for years, you very seldom get the 'viewing impression' from either that they are programming for far away places. Some of the KTVU announcers and 'hosts' will on occasion 'slip' when their program

is live and allude to 'distant viewers' but none take the direct frontal attack approach of WTCG which reminds viewers about every third station break that "WTCG Covers The Nation...via satellite".

A very high percentage of the "PI" (per inquiry) advertising we have grown accustomed to seeing on 'super 17' also plays on WGN and KTVU. If you are sick and tired of watching that oriental character bust a 1 by 2 piece of soft pine with the edge of his hand on WTCG, you won't find relief by watching WGN. The same tomato gets smashed there as well. Elvis "gold" records, Wall Street Journal and Sports Illustrated subscription offers and jogging machines crop up at virtually every break on all three stations. In a non-scientific two evening count it appeared that WGN runs ahead of the other two indies in this unimportant area.

Apparently Ted Turner is making some headway to dis-lodge some of his local (to Atlanta) advertising; less of the 'car-dealer' type advertising has been noticed on WTCG of late and more of the 'national spot buys' seem to be

12 NOON	11:00 AM	10:00 AM	9:00 AM	LOVE AMERICAN STYLE	DONAHUE	I LOVE LUCY
12:30 PM	11:30 AM	10:30 AM	9:30 AM	MOVIE 17	(SAME)	ROOM 222
1:00 PM	12 NOON	11:00 AM	10:00 AM	(SAME)	BOZO'S CIRCUS	BIG VALLEY
1:30 PM	12:30 PM	11:30 AM	10:30 AM	(SAME)	(SAME)	(SAME)
2:00 PM	1:00 PM	12 NOON	11:00 AM	NEWS - 2:25 EST	BEWITCHED	DONAHUE
2:30 PM	1:30 PM	12:30 PM	11:30 AM	I LOVE LUCY	LOVE AMERICAN STYLE	(SAME)
3:00 PM	2:00 PM	1:00 PM	12 NOON	SPEED RACER	(SAME)	CROSS WITS
3:30 PM	2:30 PM	1:30 PM	12:30 PM	THE FLINTSTONES	FAMILY AFFAIR	TRUTH OR CONSEQUENCES
4:00 PM	3:00 PM	2:00 PM	1:00 PM	SPACE GIANTS	THE FLINTSTONES	DIALING FOR DOLLARS - MOVIE
4:30 PM	3:30 PM	2:30 PM	1:30 PM	GILLIGAN'S ISLAND	NEW ADVENTURES SUPERMAN	(SAME)
5:00 PM	4:00 PM	3:00 PM	2:00 PM	I DREAM OF JEANNIE	GILLIGAN'S ISLAND	(SAME)
5:30 PM	4:30 PM	3:30 PM	2:30 PM	BEVERLY HILLBILLIES	I DREAM OF JEANNIE	(SAME)
6:00 PM	5:00 PM	4:00 PM	3:00 PM	ANDY GRIFFITH	ANDY GRIFFITH	WOODY WOODPECKER
6:30 PM	5:30 PM	4:30 PM	3:30 PM	MY THREE SONS	MY THREE SONS	(SAME)
7:00 PM	6:00 PM	5:00 PM	4:00 PM	CAROL BURNETT/ FRIENDS	DICK VAN DYKE SHOW	TOM AND JERRY SHOW
7:30 PM	6:30 PM	5:30 PM	4:30 PM	SANFORD AND SON	THE ODD COUPLE	SPIDERMAN
8:00 PM	7:00 PM	6:00 PM	5:00 PM	LET'S GO TO THE RACES	CAROL BURNETT/ FRIENDS	[HTN-Premium Movie]
8:30 PM	7:30 PM	6:30 PM	5:30 PM	LAST OF THE WILD	HOGAN'S HEROES	(SAME)
9:00 PM	8:00 PM	7:00 PM	6:00 PM	SEC BASKETBALL	THE 8 O'CLOCK MOVIE	(SAME)
9:30 PM	8:30 PM	7:30 PM	6:30 PM	(SAME)	(SAME)	(SAME)
10:00 PM	9:00 PM	8:00 PM	7:00 PM	(SAME)	(SAME)	THE ODD COUPLE
10:30 PM	9:30 PM	8:30 PM	7:30 PM	(SAME)	(SAME)	THE DATING GAME
11:00 PM	10:00 PM	9:00 PM	8:00 PM	HOGAN'S HEROES	JACK TAYLOR/NEWS	8 O'CLOCK MOVIE
11:30 PM	10:30 PM	9:30 PM	8:30 PM	MOVIE 17	WGN MOVIE	(SAME)



WGN PROGRAMMING has that look of well seasoned experience; station has been an 'indie' since April of 1948. Call letters are a part of many programs (i.e. "THE WGN 8:00 Movie").

showing up on Super 17. KTVU, possibly because of its Cox family lineage, also seems to have a fairly high proportion of national buy advertising while WGN has a relatively small amount. However WGN does have lots of carpet and car dealer sponsors for Chicago-land and

interesting perhaps is that many of their commercials specify "no calls from beyond 150 miles".

All three stations are 'slickly produced', well operated and attractively packaged.

The Split Day At KTVU

The 'opportunity' to do something with transponder 1 prior to the normal KTVU program sign on (10 AM eastern) was apparently more than innovative Ed Taylor and his crew at SSS/SCS could stand. So they put together something called the "Satellite Program Network" or SPN for short. Here is what it does:

Every morning, from 7 AM eastern until 10 AM eastern, Taylor turns on an uplink transmitter at his owned and operated Atlanta area uplink site and he places some 3/4 inch program tapes on a special 3/4 inch set of machines which have lots of accessory electronics attached to try to make their visible product as good as a 2 inch quad machine. And for three hours the industry's first "ad-hoc" programming operation is on the bird.

During this three hour period every weekday (and from 7 AM to 12 noon on Saturday and Sunday) Taylor's SPN brings up specialty programs that by in large are not seen on any television station anyplace; or very few at best. Program titles include 'Financial Survival', 'Fran Carlton Show' (exercise), 'Bass Fishin' America', 'High Adventure' and others. During this 25 hours or so per week SPN is providing unique-to-cable programming to what Taylor believes will be "more than a half million U.S. homes very soon...". Some of the programs are sponsored by their producers. 'Financial Survival', for example, includes frequent messages for the host's booklets and other literature which he suggests will help the viewers be better prepared for a financial downturn in America. Other programs have the old and often familiar "PI" advertising which one sees on WTCG or other stations.

Taylor has assembled a very well known group as an advisory board for SPN and this group of people represents many of the major cable system users of satellite signals. Taylor hopes that cable systems will not only use the no-charge SPN programming for their cable system, but he also looks for the day when **cable-system-produced programs** will be aired on SPN. Some of the programs offered for nomination in the 1979 NCTA programming awards promotion are likely to be seen via SPN before the 'judges' vote on this year's best.

Now on Monday through Friday SPN is 'clipping' only a tiny amount of KTVU regular programming. The station signs on around 9:30 AM eastern so at most SPN eliminates 30 minutes of KTVU coverage. However on Saturday and Sunday transponder 1 is not activated by SCS until KTVU is into its third hour of the day. Still, Taylor's heard very little in the way of complaints about this procedure since the 'clipped programming' is largely of interest to

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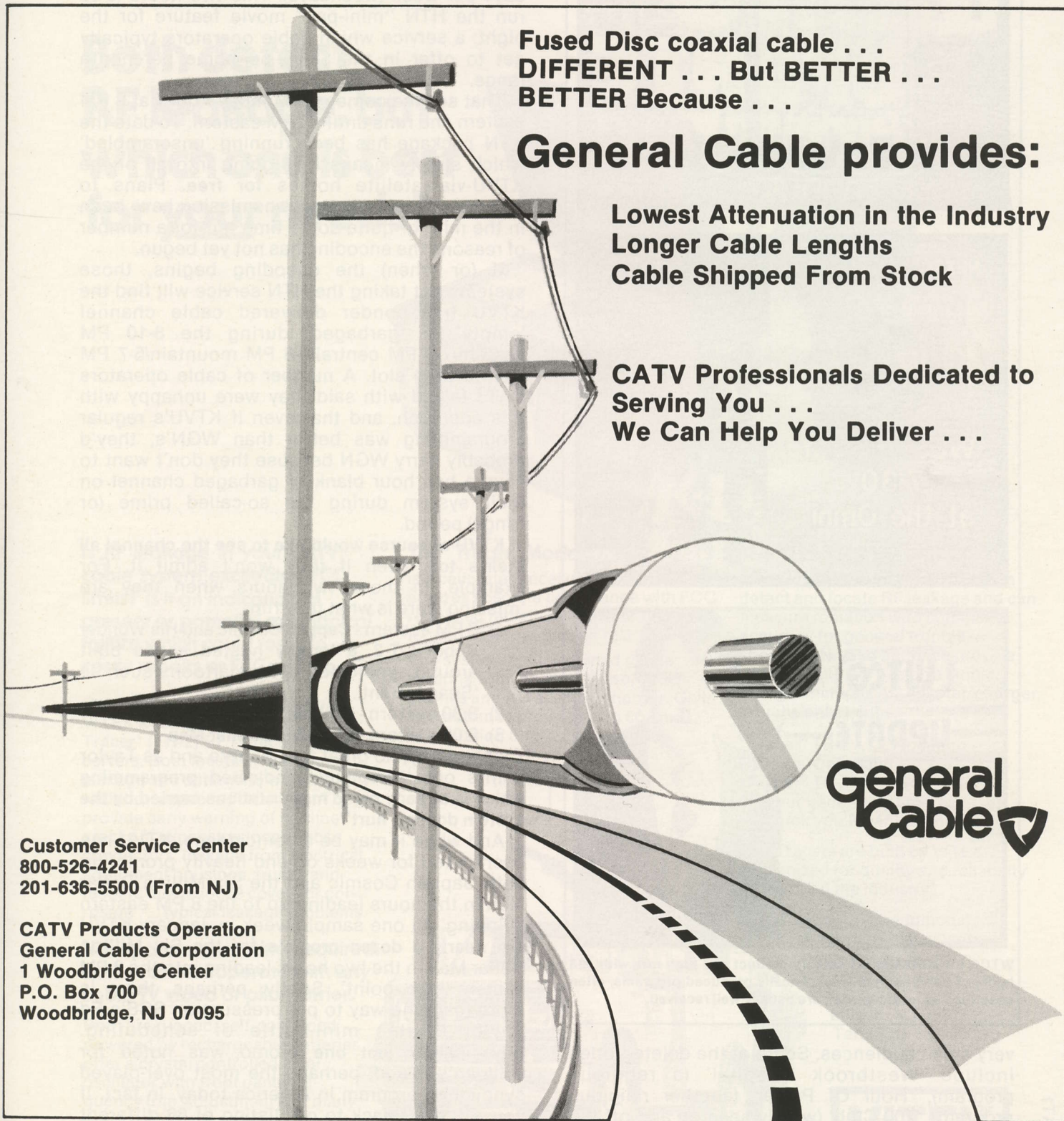
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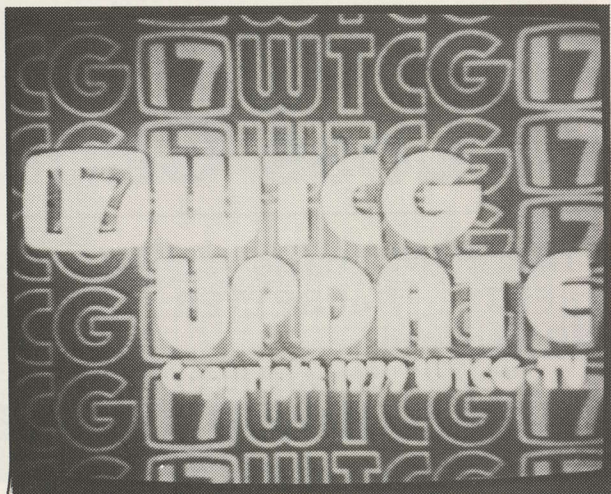
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P.O. Box 700
Woodbridge, NJ 07095





WTCG PROGRAMMING eats up product at a high rate with 168 hours of operation per week. Locally produced programs, often described as 'avant-garde', are usually well received.

very small audiences. Some of the deleted titles include 'Westbrook Hospital' (a religious program), 'Hour Of Power' (another religious program), '700 Club' (widely seen on and off the satellite), 'America's Black Forum' and 'Voice of Agriculture'.

Another period of 'KTVU clipping' towards the opposite side of the day has drawn more vocal criticism of SCS. Way back before KTVU was launched, in fact back when everyone thought they would launch on transponder 18, the New England "mini-pay" service HTN (Home Theater Network) worked out an agreement with SCS to sub-let two hours on the KTVU transponder, five days per week (weekdays). This two hours is to run the HTN "mini-pay" movie feature for the night; a service which cable operators typically get to offer in the \$4.00 per-home per-month range.

That service comes up Monday-Friday at 8 PM eastern and runs until 10 PM eastern. To date the HTN package has been running 'unscrambled' which simply means it is going into all of the KTVU-via-satellite homes for free. Plans to scramble or encode the transmission have been in the mill for quite some time but for a number of reasons the encoding has not yet begun.

If (or when) the encoding begins, those systems not taking the HTN service will find the KTVU transponder delivered cable channel 'empty' or 'garbaged' during the 8-10 PM eastern/7-9 PM central/6-8 PM mountain/5-7 PM pacific time slot. A number of cable operators CATJ talked with said they were unhappy with this approach, and that even if KTVU's regular programming was better than WGN's, they'd probably carry WGN because they don't want to have a two hour blank or garbaged channel on their system during the so-called prime (or fringe) period.

KTVU of course would like to see the channel all their's too. Even if they won't admit it. For example, in those two hours when they are 'missing' here is what they run:

- 1) 8 PM eastern - **Captain Cosmic and His Wonder Robot 2-T-2**, a locally hosted series built around syndicated space-cartoons such as 'Space Giant'.
- 2) 8:30 eastern - **Gilligan's Island**
- 3) 9:00 eastern - **Six Million Dollar Man**

Seemingly, no great losses here and as Taylor points out "Dropping syndicated programming which is already on so many stations carried by the system doesn't hurt".

And while it may be a coincidence, KTVU has been noted for weeks on end heavily promoting both Captain Cosmic and the Six Million Dollar Man in the hours leading up to the 8 PM eastern 'clipping'. In one sample week in January KTVU ran nearly a dozen promo's for the Six Million Dollar Man in the two hours leading into the 8 PM eastern 'clip point'. Subtly, perhaps, there is more than one way to put pressure on SCS's Ed Taylor in this mini-battle of scheduling. Significantly, **not one** promo was noted for Gilligan's Island; perhaps the most over-played syndicated program in America today. In fact, if you will refer back to our listing of 66 different syndicated programs appearing on the three indies you will note that if Gilligan were not



SPECIAL NETWORKS such as that created by Mobil Oil for Edward The King on occasion encompass all three of the indies. This program, now on Wednesdays on each, is the exception however, not the rule.

clipped on KTVU, it would be the **sole program** among the 66 listed to be carried on all 3 of the satellite delivered indies!

More To Come?

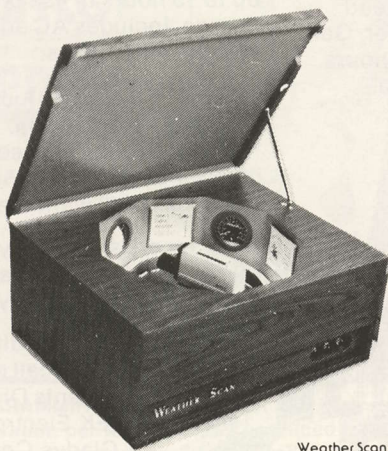
At some point in time, probably not before the launch and activation of RCA SATCOM F3, there will be additional 'independent' TV stations available via satellite. But for the next year or so, at least on the SATCOM bird, the three we now have are all we will have and thus the battle for supremacy shapes up.

The key element may well be the station itself rather than the availability of the signal and its programming. No station can afford to disregard its local market and as the only **VHF indies** in Chicago and San Francisco/Oakland, WGN and KTVU have got to watch their flanks pretty carefully for fear that their local UHF competition may make inroads on their **local** operations.

Turner doesn't have that problem. He's a UHF indie in a market with no VHF indie competition and only token competition from two additional UHF outlets. He can afford to gamble for the big national market because he has no place to go but ahead.

Either WGN or KTVU, or both, could give Mr. Turner a run for his money if they chose to do battle with the man from Atlanta. But if they are going to do it, they had better get a move on. Should WTCG's growth continue in 1979 as it has in 1978 he may just have such a formidable lead that not they...nor anyone else...will ever catch up.

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How Many Bucks To Spend?

ESTIMATING MICROWAVE SYSTEM COSTS

During 1977 there were a number of articles in **CATJ** describing microwave system design considerations. Additionally there has been some minimum discussion of microwave systems cost. It was felt by the author that perhaps a more detailed discussion of microwave system costs might be useful to those operators who would like to consider the use of CARS microwave but who are unable to accurately gauge the economic impact. It will be shown that many of the costs, although very real, are hidden. **These hidden costs can result in a system costing thousands of dollars more than the original estimates.**

In an attempt to show as many different costs as possible a model system will be described and cost evaluated.

Model System

Our model system will consist of a signal pick-up/microwave transmit site at one end feeding one channel into an existing CATV system with an adequate tower **without** adequate torque stabilization.

A completely new site will be installed at the signal pick-up location which will utilize a periscope (i.e. passive reflector) antenna system. At the receive site a direct radiator (parabolic) receive antenna will be placed atop the 300 foot CATV tower since there is not adequate space for a periscope receive antenna. Because of the long transmission line run down the tower **circular** rather than elliptical waveguide will be used to minimize signal losses. Stand by battery power will be used at the signal pick-up point due to the remoteness of the site and attendant possibilities of temporary power outages.

With the model in mind, **table 1** shows the equipment that is required at the signal pick-up location and its cost.

Table 1—Signal Pick-up Location Equipment Requirements

Description	Cost
250 foot—40 inch face triangular guyed tower with Starmount	\$10,000.00
Ground rods and ground wire	\$ 250.00
Tower installation	\$ 2,500.00
8'x10' concrete block building with air conditioning and wiring	\$ 2,500.00
10 foot pylon	\$ 300.00
Site clearing	\$ 200.00
Power line construction	\$ 2,000.00
Road construction—1/4 mile	\$ 900.00
CATV receive antenna	\$ 500.00
6' microwave antenna with pylon mount and radome	\$ 975.00
8'x12' microwave reflector	\$ 1,200.00

30' elliptical waveguide with hardware and connectors	\$ 240.00
3 foot flexible waveguide sections	\$ 150.00
Antenna system installation	\$ 200.00
Waveguide protection hardware	\$ 50.00
Microwave transmitter (FM—.5 watt)	\$ 5,500.00
TV demodulator	\$ 1,800.00
Stand-by power for demodulator	\$ 250.00
Battery charger	\$ 800.00
Batteries	\$ 400.00
Equipment rack	\$ 125.00
Equipment installation	\$ 200.00
Dry air pump and fittings (waveguide pressurization)	\$ 350.00
Path alignment	\$ 250.00
Attorney fees	\$ 500.00

Table 2—Receive Site Equipment Requirements

Description	Cost
Starmount	\$1,100.00
Starmount installation	\$ 750.00
New tower anchors	\$ 380.00
Anchor installation	\$ 150.00
6' microwave antenna with tower mount and radome	\$ 975.00
280' circular waveguide with hardware, hangers and connectors	\$4,200.00
30' elliptical waveguide with hardware and connectors	\$ 240.00
3 foot flexible waveguide sections	\$ 150.00
Waveguide protection hardware	\$ 50.00
Antenna and waveguide installation	\$ 400.00
Microwave receiver	\$5,300.00
Power supply for microwave receiver (115 V AC—48 V DC)	\$ 250.00
TV modulator	\$1,600.00
Equipment rack	\$ 125.00
Radio equipment installation	\$ 200.00
Tunnel diode amplifier (optional)	\$1,100.00
Dry air pump and fittings (waveguide pressurization)	\$ 350.00
Path alignment	\$ 250.00

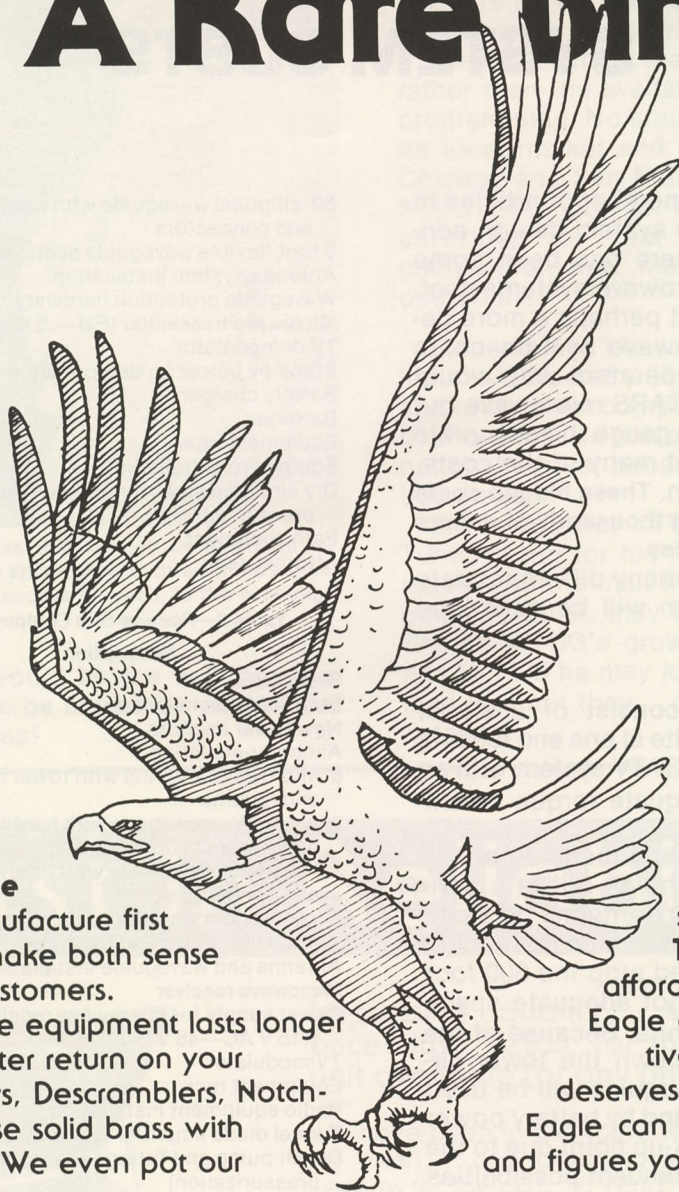
To add each additional microwave channel to the model system would require the equipment shown in **tables 3 and 4**.

We also assume that the powering equipment was sufficient to carry the final load.

CATJ's on-going coverage of microwave topics picks up again this month with a cost-analysis study system as outlined by veteran CATJ author Bill Ellis.

Ellis covers important aspects of cost-planning including providing check lists for well understood and hidden costs. His company makes extensive use of a line of top quality FM microwave (single channel per transmitter/receiver) equipment; and while the transmitter/receiver costs may not 'play' in AML or 'low-cost microwave' system estimates, the procedures outlined ring true.

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**Table 3—Equipment Required to Add
a Channel at Signal Pickup Location**

Description	Cost
TV antenna	\$ 500.00
TV demodulator	\$1,800.00
Microwave transmitter	\$5,500.00
Circulator (to combine microwave signals)	\$ 350.00

**Table 4—Equipment Required to Add a Channel at
Receive Location**

Description	Cost
TV modulator	\$1,600.00
Microwave receiver	\$5,300.00
Circulator (to split microwave signals)	\$ 350.00

By using all of the individual cost factors shown in tables 1-4 it is possible to delete and add costs to conform to any specific situation.

The costs shown in the table reflect actual costs based on the approximate list prices of hardware. Depending upon manufacturer, the costs may vary to some degree. Additionally, for volume purchase of equipment, it is possible that a lower price could be obtained because some manufacturers offer quantity discounts. Discounts were not used in the figures shown.

In the initial system planning cost estimating stages certain items are likely to be forgotten and constitute the hidden costs noted earlier. These items noted below can be a substantial part of the entire system cost.

Possible "Hidden" Costs

Legal (for FCC permits, site leases and zoning)

Travel expenses

Local hardware purchases

Back hoe

Concrete

Tower crew

2-way radio rental for path alignment

Local metal fabrication and welding

Lumber for concrete forms

Path profiles (labor and maps)

Field surveys

Site acquisition and zoning (time and travel expenses)

Spare parts

Test equipment

The accuracy of cost estimates can be enhanced by making a check list as shown in table 5. It is then a simple matter of scanning the list and noting quantities and calculating the cost on a site by site basis. This method has been used for cost planning over 75 microwave sites and has been both helpful and accurate. Additionally, copies of the check list can be furnished to the technician in charge of site installation and the tower crew for installation planning purposes.

Armed with the foregoing information and above all an awareness of the possible equipment and services needed, the cable operator should be in a much better posture to accurately estimate microwave system construction costs.

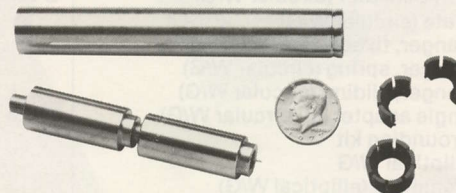
Eagle Quality



PAY TV SCRAMBLER

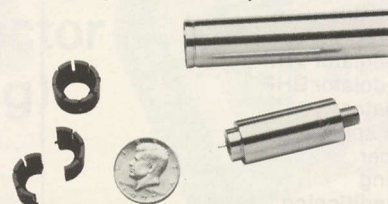
This generator is made to complement the Eagle Model 2-DF outdoor decoding filters to form a system that economically secures pay channel reception for the CATV system operator.

This scrambler is designed to deliver the encoded signal to the system without additional and possibly expensive peripheral equipment.



an outdoor-tap mounted DESCRAMBLER

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Table 5

Description	Site 1	Site 2	Site 3	Site 4	Site 5	Purchase Order Number
Dish 2'						
Dish 4', tower w/mount						
Dish 4', pylon w/mount						
Dish 6', tower w/mount						
Dish 6', pylon w/mount						
Dish 8', tower w/mount						
Dish 8', pylon w/mount						
Tie back						
Reflector 8'x12'						
Radome 4'						
Radome 6'						
Radome 8'						
CATV off-air antenna						
Tower						
Starmount						
Pylon						
Anchors						
Turnbuckle						
Preform deadends						
Tie-back bracket						
Guy wire						
Lighting, tower						
Circular W/G, 20' sections						
Transitions (circular)						
Compensator (circular W/G)						
Plate (circular W/G)						
Hanger, fixed (circular W/G)						
Hanger, spring (circular W/G)						
Hanger, sliding (circular W/G)						
Angle adapter kit (circular W/G)						
Grounding kit						
Elliptical W/G						
Transition (elliptical W/G)						
Wall/roof feed through (elliptical W/G)						
Pressure gauge						
Pressure inlet valve						
Splice (elliptical W/G)						
2' flex W/G						
3' flex W/G						
Battery charger 24V						
Battery charger 48 V						
Batteries						
Power supply						
transmitter						
Receiver						
Demodulator VHF						
Demodulator UHF						
Circulator						
Power splitter						
Clamper						
Building						
Air conditioning						
Filter (microwave channel)						
Tunnel diode amplifier						

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Where To Find

BELL TELCO SYSTEM LIASON REPS

The American Telephone and Telegraph Company has released their latest revised listing of whom you are to contact for CATV system joint-pole planning (i.e. pole attachment) or conduit-sharing. To begin planning, construction, or expansion of a cable system which has one or more Bell system poles contacted, select from this list the closest area Bell liason representative and begin your 'negotiations'.

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Phoenix, Arizona 85012
602 263-3433

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Southwestern Bell Telephone
1111 W. Capitol - Room 617
Little Rock, Arkansas 72203
501 371-6144

CALIFORNIA

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Pacific Telephone & Telegraph Co.
85 Second Street, Room 612
San Francisco, California 94105
415 542-2851

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Rudell Hughes
Mountain Bell Telephone Company
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Denver, Colorado 80201
303 624-6427

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Southern New England Telephone Co.
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203 771-2321

DELAWARE

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Bell Telephone Co. of Pennsylvania
One Parkway
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215 466-3091

FLORIDA

(Northern)

R. E. Moore
Southern Bell Tel. & Tel. Company
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Jacksonville, Florida 32202
904 353-2681

(Southwestern)

C. E. Hanle
Southern Bell Tel. & Tel. Company
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Ft. Lauderdale, Florida 33310
305 776-2788

(Southern)

R. E. Leon
Southern Bell Tel. & Tel. Company
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P.O. Box 440100
Miami, Florida 33144
305 263-3911

GEORGIA

W. J. Hogan
Southern Bell Tel. & Tel. Company
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Atlanta, Georgia 30346
404 391-4870

IDAHO

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208 385-2302

D. W. Wing
Pacific Northwest Bell
Sixteen Hundred Bell Plaza,
Room 2808
Seattle, Washington 98191
206 345-8550

ILLINOIS

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Illinois Bell Telephone Company
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Chicago, Illinois 60606
312 727-1375

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Indianapolis, Indiana 46204
317 265-8445

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Cincinnati Bell Inc.
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Cincinnati, Ohio 45202
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913 296-8881

KENTUCKY

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Louisville, Kentucky 40202
502 589-7634

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Cincinnati Bell Inc.
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Cincinnati, Ohio 45202
513 397-2198

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Joyce Ponti
South Central Bell
1215 Prytania Street
New Orleans, Louisiana 70140
504 831-4420

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New England Telephone &
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Portland, Maine 04103
207 797-1588

MARYLAND

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Chesapeake & Potomac Tel. Co. of Md.
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Baltimore, Maryland 21202
301 393-4534

MASSACHUSETTS

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New England Telephone &
Telegraph Co.
101 Huntington Ave. - Suite 1900
Boston, Massachusetts 02199
617 743-9473

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Michigan Bell Telephone Company
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313 552-1453

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612 344-6623

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601 961-1712

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St. Louis, Missouri 63101
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(Kansas City Area)

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Kansas City, Mo. 64106
816 275-8660

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402 422-3628

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Reno, Nevada 89510
702 789-6203

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426 Main St.
Laconia, New Hampshire 03246
603 524-9972

NEW JERSEY

R. J. Legato
New Jersey Bell Telephone Co.
540 Broad Street - Room 1300
Newark, New Jersey 07101
201 649-3856

NEW MEXICO

John Sechrist
Mountain Bell Telephone Co.
625 Silver SW
Albuquerque, New Mexico 87101
505 765-7281

NEW YORK

E. C. Engborg, Jr.
New York Telephone Company
1250 Broadway - 36th Floor
New York, N. Y. 10001
212 395-5443

NORTH CAROLINA

Ms. Gay Lindeman
Southern Bell Tel. & Tel. Co.
P.O. Box 240 - Fifth Floor,
Southern National Center
Charlotte, North Carolina 28201
704 377-8980

NORTH DAKOTA

G. L. Anderson
Northwestern Bell Telephone Co.
P.O. Box 1900
Fargo, North Dakota 58102
701 235-3248

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James V. Fyfe
Ohio Bell Telephone Co.
1300 East 9th Street - Room 1929
Cleveland, Ohio 44114
216 822-3685

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Cincinnati Bell Inc.
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405 236-7666

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Portland, Oregon 97232
503 238-3002

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Bell Telephone Co. of Pennsylvania
One Parkway Bldg.
Philadelphia, Pa. 19102
215 466-3091

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J. E. Douglas
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101 Huntington Ave., Suite 1900
Boston, Massachusetts 02199
617 743-9473

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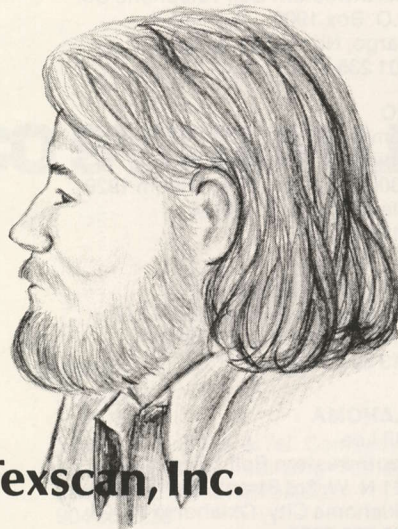
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dB RELATIONSHIPS

VOLTAGE OR CURRENT RATIO	MINUS	POWER RATIO	dB	VOLTAGE OR CURRENT RATIO	PLUS	POWER RATIO
1.00		1.00	0	1.00		1.00
.9986		.9972	.1	1.012		1.023
.9772		.9550	.2	1.023		1.047
.9661		.9333	.3	1.035		1.072
.9550		.912	.4	1.047		1.096
.9441		.8931	.5	1.059		1.122
.9333		.871	.6	1.072		1.148
.922		.8511	.7	1.083		1.174
.912		.8319	.8	1.096		1.202
.9016		.812	.9	1.109		1.230
.8913		.7943	1.0	1.122		1.259
.7943		.6310	2	1.259		1.585
.7079		.5012	3	1.413		1.995
.6310		.3981	4	1.585		2.512
.5623		.3162	5	1.778		3.162
.5012		.2512	6	1.995		3.981
.4467		.1995	7	2.239		5.021
.3981		.1581	8	2.512		6.310
.3548		.1259	9	2.818		7.943
.3162		.100	10	3.162		10.000
.2818		.07943	11	3.548		12.59
.2512		.0631	12	3.981		15.85
.2239		.0501	13	4.467		19.95
.1995		.0398	14	5.012		25.12
.1778		.03162	15	5.623		31.62
.1585		.02512	16	6.310		39.81
.1413		.01995	17	7.079		50.12
.1259		.01585	18	7.943		63.10
.1122		.01259	19	8.913		79.43
.1000		.01000	20	10.00		100.00
.03162		.00100	30	31.62		1000
.0100		.0001	40	100.00		10.000
.003162		.00001	50	316.2		10 ⁵
.0010		10 ⁻⁶	60	1000		10 ⁶
3.16 x 10 ⁻⁴		10 ⁻⁷	70	3162		10 ⁷
1.0 x 10 ⁻⁴		10 ⁻⁸	80	10000		10 ⁸
A		B		C		D

TABLE ONE

The Decibel And The dBmV

A decibel is defined to be $10 \log_{10} \frac{P_2}{P_1}$ where P_2 = output power and P_1 = input power. If the sign of the dB is positive, it indicates gain and if negative, indicates loss.

Ohm's law for power, $P = E^2/R$ allows us to substitute in the dB equation as follows:

$$dB = 10 \log_{10} \frac{P_2}{P_1} = 10 \log_{10} \frac{\frac{E_2^2}{R_2}}{\frac{E_1^2}{R_1}}$$

if $R_1 = R_2$, the equation may be rewritten:

$$dB = 10 \log \frac{E_2^2}{E_1^2} = 10 \log \left(\frac{E_2}{E_1} \right)^2$$

by the laws of logarithms, $\log_a X^N = N \log_a X$, we may write:

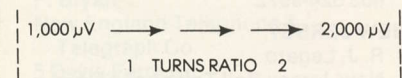
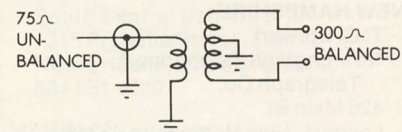
$$dB = 2 \times 10 \log \frac{E_2}{E_1} = 20 \log \frac{E_2}{E_1}$$

A similar example exists for current, $P = I^2R$ and

$$dB = 20 \log \frac{I_2}{I_1}$$

Most measurements concern the voltage and power equations. The dB is **only** a ratio of like quantities; it is a dimensionless unit.

In past years, the use of logarithms and anti-logarithms was made difficult by the need to consult confusing log tables. Today, a scientific calculator with log, inverse log and trigonometric



THE IMPEDANCE VARIES AS THE SQUARE OF THE TURNS RATIO. A 4:1 IMPEDANCE CHANGE (I.E. 75 TO 300 = 4:1) IS A 2:1 TURNS RATIO. A 2,000 μV VOLTAGE ON THE SECONDARY (OUTPUT SIDE AT 300Ω) IS DERIVED FROM A 1,000 μV VOLTAGE ON THE PRIMARY (INPUT SIDE, 75Ω) SIDE. TO CHECK, CALCULATE POWER ON EACH SIDE (ASSUME 100% EFFICIENCY IN THE TRANSFORMER).

75Ω SIDE:

$$P = E^2/R \\ = \frac{(10^{-3})^2}{75} = \frac{10^{-6}}{75} = 0.133 \text{ mW}$$

300Ω SIDE:

$$P = E^2/R \\ = \frac{2 \times 10^3}{2000} = \frac{(2000 \mu V)^2}{300} = 0.133 \text{ mW}$$

FIGURE TWO

TABLE TWO

dB POWER	RATIO	dB VOLTAGE	dB POWER	RATIO	dB VOLTAGE
0	1.0	0	6.812	4.8	13.625
.414	1.1	.828	6.902	4.9	13.804
.792	1.2	1.584	6.990	5.0	13.979
1.139	1.3	2.279	7.076	5.1	14.151
1.461	1.4	2.923	7.160	5.2	14.320
1.761	1.5	3.522	7.243	5.3	14.486
2.041	1.6	4.082	7.324	5.4	14.648
2.304	1.7	4.609	7.404	5.5	14.808
2.553	1.8	5.105	7.482	5.6	14.964
2.788	1.9	5.575	7.559	5.7	15.117
3.010	2.0	6.021	7.634	5.8	15.269
3.222	2.1	6.444	7.709	5.9	15.418
3.424	2.2	6.848	7.782	6.0	15.563
3.617	2.3	7.235	7.853	6.1	15.707
3.802	2.4	7.604	7.924	6.2	15.848
3.979	2.5	7.959	7.993	6.3	15.987
4.150	2.6	8.299	8.062	6.4	16.124
4.314	2.7	8.628	8.129	6.5	16.258
4.472	2.8	8.943	8.195	6.6	16.391
4.624	2.9	9.248	8.261	6.7	16.521
4.771	3.0	9.542	8.325	6.8	16.650
4.914	3.1	9.827	8.388	6.9	16.777
5.051	3.2	10.102	8.451	7.0	16.902
5.185	3.3	10.370	8.513	7.1	17.025
5.315	3.4	10.630	8.573	7.2	17.147
5.441	3.5	10.882	8.633	7.3	17.266
5.563	3.6	11.126	8.692	7.4	17.385
5.682	3.7	11.364	8.751	7.5	17.501
5.798	3.8	11.596	8.808	7.6	17.616
5.911	3.9	11.821	8.865	7.7	17.730
6.021	4.0	12.041	8.921	7.8	17.842
6.128	4.1	12.256	8.976	7.9	17.953
6.232	4.2	12.456	9.031	8.0	18.062
6.335	4.3	12.669	9.085	8.1	18.110
6.435	4.4	12.869	9.138	8.2	18.276
6.532	4.5	13.064	9.191	8.3	18.382
6.628	4.6	13.255	9.243	8.4	18.486
6.721	4.7	13.442	9.294	8.5	18.690
E	F	G	9.345	8.6	18.690
			9.395	8.7	18.790
			9.445	8.8	18.890
			9.494	8.9	18.988
			9.542	9.0	19.085
			9.590	9.1	19.181
			9.638	9.2	19.276
			9.685	9.3	19.370
			9.731	9.4	19.463
			9.777	9.5	19.554
			9.823	9.6	19.654
			9.868	9.7	19.735
			9.912	9.8	19.825
			9.956	9.9	19.913
			10.00	10.0	20.00
			20	100	40
			30	1000	60
			40	10000	80
			50	1000000	100
			60	10000000	120
			E	F	G

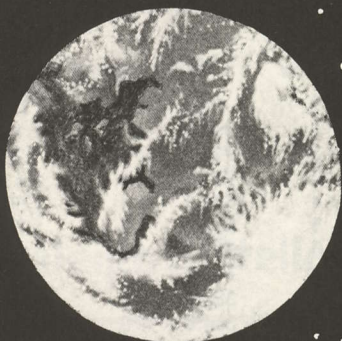
To find **exact** voltages, we can use Table 1 and multiply the 1000 μ V standard by column B or C depending on whether the value of dBmV is + or -. Use column B for dB **below** reference and column C for values **above** reference.

For example: What voltage is represented by -17 dBmV? In table 1, find 17 dB, locate the voltage ratio

dBmV	mV	dBmV	mV
0	1000	0	1.00
-1	891.3	+1	1.122
-2	794.3	+2	1.259
-3	707.9	+3	1.413
-4	631.0	+4	1.585
-5	562.3	+5	1.778
-6	501.2	+6	1.995
-7	446.7	+7	2.239
-8	398.1	+8	2.512
-9	354.8	+9	2.918
-10	316.2	+10	3.162
-11	281.8	+11	3.548
-12	251.2	+12	3.981
-13	223.9	+13	4.476
-14	199.5	+14	5.012
-15	177.8	+15	5.623
-16	158.5	+16	6.310
-17	141.3	+17	7.079
-18	125.9	+18	7.943
-19	112.2	+19	8.913
-20	100.0	+20	10.0
-21	89.13	+21	11.22
-22	79.43	+22	12.59
-23	70.79	+23	14.13
-24	63.10	+24	15.85
-25	56.23	+25	17.78
-26	50.12	+26	19.95
-27	44.67	+27	22.39
-28	39.81	+28	25.12
-29	35.48	+29	28.18
-30	31.62	+30	31.62
-31	28.18	+31	35.48
-32	25.12	+32	39.81
-33	22.39	+33	44.76
-34	19.95	+34	50.12
-35	17.78	+35	56.23
-36	15.85	+36	63.10
-37	14.13	+37	70.79
-38	12.59	+38	79.43
-39	11.22	+39	89.13
-40	10.00	+40	100
-41	8.913	+41	112.2
-42	7.943	+42	125.9
-43	7.079	+43	141.3
-44	6.310	+44	158.5
-45	5.623	+45	177.8
-46	5.012	+46	199.5
-47	4.467	+47	223.9
-48	3.981	+48	251.2
-49	3.548	+49	281.8
-50	3.162	+50	316.2
-51	2.818	+51	354.8
-52	2.512	+52	398.1
-53	2.239	+53	447.6
-54	1.995	+54	501.2
-55	1.778	+55	562.3
-56	1.585	+56	631.0
-57	1.413	+57	707.9
-58	1.259	+58	794.3
-59	1.172	+59	891.3
-60	1.000	+60	1000

TABLE THREE

**Our capabilities
are out of this world**



But you don't have to be. Comsearch, Inc. in one year has established itself as a leader in the satellite communications industry. We specialize in Frequency coordination of satellite earth stations.

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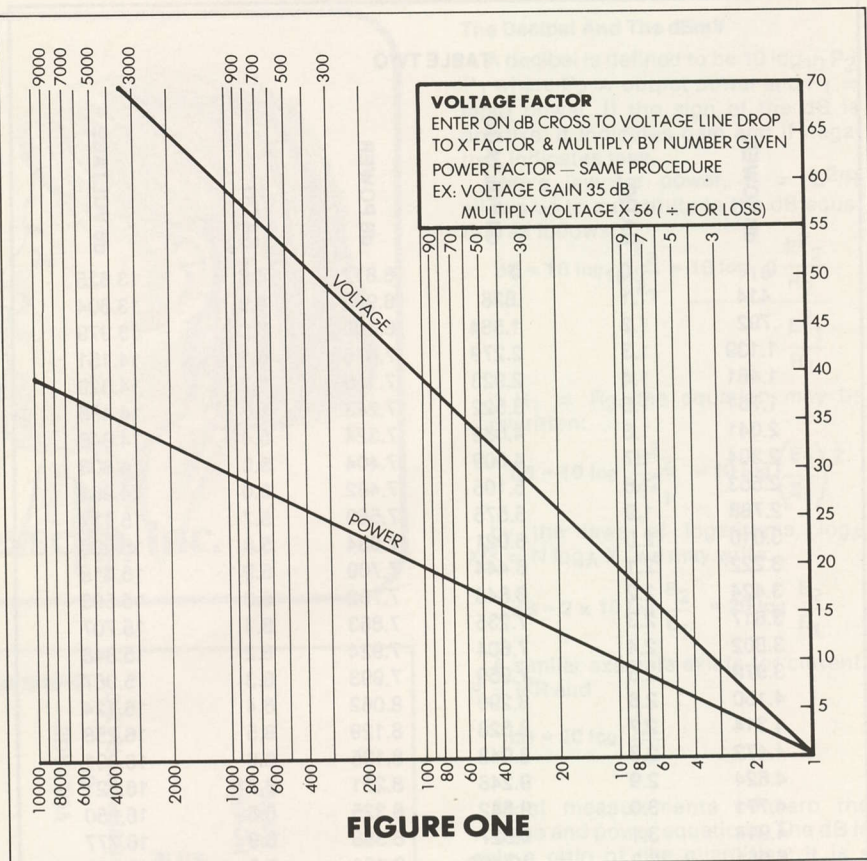


FIGURE ONE

functions can be purchased for \$25-30. The use of one of these devices eliminates the need to consult log tables.

There are several charts included here which have been prepared to make the calculation of dB values even simpler. The chart in table 1 is the voltage and power ratios vs. dB. Knowing the ratio of P_2/P_1 or E_2/E_1 or I_2/I_1 and consulting table 1, you can read dB directly. A & B represent dB loss and C & D represent dB gain.

Table 2 is the inverse of table 1. Given the dB value, first find the ratio value. The equation is as follows:

$$F = \frac{E}{10^{10}} \text{ and } F = \frac{G}{10^{20}}$$

You can combine the numbers in table 2 as follows to obtain any dB

value.

Example:

$$\text{Voltage ratio } 27 = 10 \times 2.7$$

$$= 20 + 8.628 = 28.628$$

This is the result of the law of logarithm which states:

$$\log_A xy = \log_A x + \log_A y \text{ and}$$

$$\log_A \frac{x}{y} = \log_A x - \log_A y$$

The graph, figure 2, is a restatement of the principles utilized in tables 1 and 2. Knowing either the ratio or the dB number, you can quickly locate the corresponding value.

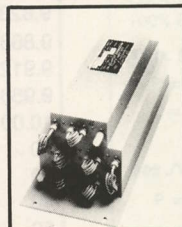
In CATV, we set a standard value for a zero reference so that we can easily express the normal range of voltages in terms of dB above or below that reference level.

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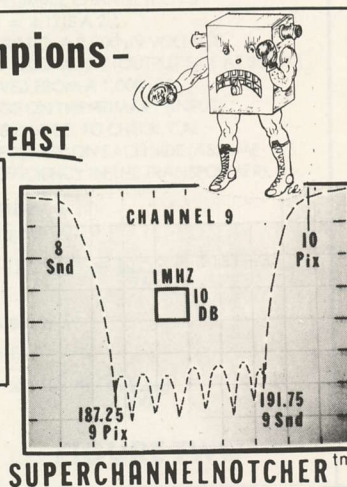
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0.1413. Multiply by 1000 μ V and our answer is 141.3 μ V = -17 dBmV. A tabulation of dBmV vs. voltage is included for reference in table 3.

It was experimentally determined that 2,000 μ V at 300 ohms impedance into the terminals of a TV set would produce a high quality picture. Transforming

the impedance in a balun to 75 ohms, we have figure 1. 1000 μ V across 75 ohms is the 0 dB standard for CATV. The proper nomenclature for this standard is dBmV, which means dB referenced to 1 mV (1000 μ V) across 75 ohms.

There are some instruments in CATV

systems which are 50 ohm units. The calibration is in dBm's. The dBm standard is 1 mw at 50 ohms. In order to convert back and forth to dBmV, simply add 48.68 dB to the dBmV number to obtain dBm. This number is derived as follows:

$$1 \text{ mw} = 0 \text{ dBm}, 1 \text{ mw in } 75 \text{ ohms} = .273 \text{ V} = +48.682 \text{ dBmV}$$

LOW-COST ALPHANUMERIC CHARACTER GENERATOR

\$450 for a character generator! This unit comes complete with keyboard, and storage to hold 6 pages of information. And for just \$99 an additional 24 pages can be accessed. Plus the unit can be serviced through over 3500 stores across the country.

The unit that can do this is the Radio Shack TRS-80. If you buy just the computer and tape deck without the monitor, it will cost you \$450. And if you are a shareholder in Tandy Corporation stock, you can save an extra 10%. Every Tandy stockholder receives a 10% discount on any purchase at Radio Shack.

But once you bought the unit, you need a program to allow it to work as a character generator for your system. "The Video Pager 1.0" is such a program. This is a machine language computer program (i.e., not written in BASIC). In Level I TRS-80's you simply 'LOAD' the program so that when it is finished loading the program immediately begins. In Level II you use the 'SYSTEM' command.

The program operates as a character generator by displaying a number of pages which you have written on a rotating basis. Pages are displayed for the amount of time specified by the user. Also, the user specifies the total number of pages which the program will rotate through. Options are also available for saving pages on tape and reading these tapes back into the system.

Once you have this program running, it will print the title on the screen and print a prompt. It then waits for your command. With the present version you have seven possible commands available. You can make (or write) a page, recall any page, set the time delay and the maximum number of pages, read and write pages on tape, and go to the display.

The first thing to do when using the program is to make (or write) a page. Pressing the letter 'M' followed by the page number does this. The computer display goes blank so that you can type in the screen from the keyboard. For example, the following message could be displayed:

HAPPY EASTER
FROM THE "CATJ" STAFF

Or one of a hundred different community announcements. There is also the possibility of commercial or classified ads. When you have completed the screen press the 'BREAK' key. This stores that screen as a page and then allows you to enter another command.

Ray Daly on Computers In Cable

Ray Daly, President
Computer Cablevision, Inc.
2617 42nd St. NW
Washington, D.C. 20007

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At anytime you can recall any of these pages by pressing the 'R' key and then the page number you want to see. This

will be displayed on the screen until you want to go onto the next command. This is useful for both

THE COMPUTER CABLEVISION SOFTWARE EXCHANGE

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1. **Geostationary Satellite Finder** (see above)
Level II 4k.
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Level I or II 4k. \$9.95
6. **Editor** from Software Associates
word processor that works with disks
DOS 32k. \$39.95

To order any program send order to **Computer Cablevision**; 2617 42nd St NW #2; Washington, DC 20007; or phone (202) 337-4691. Please enclose payment with order, and add \$1.00 per order for shipping.

review of the pages in the computer or if you only want a single page displayed.

By pressing the 'G' key, the computer starts to display the pages in the memory. It starts with page 0, and works its way up until it reaches its maximum. By default this is set to six. This can be modified by pressing the

'P' key and then entering the highest page number for it to cycle through. This number of pages is limited by the amount of memory you have in your TRS-80. With 4k of memory the maximum is 6 pages and with 16k it is 30 pages. If you add the expansion interface, the maximum would be 94 pages if you added the full 32k to that machine.

While at CCOS '78 I met Bill Marshall of Waynoka Community TV. Bill had written an article on a program he had developed for his calculator. (See the August 1977 issue of CATJ, "Programmable Calculator Speeds Feeder System Designs"). Bill and I converted this calculator program to the TRS-80 and later, we discussed this program during the 'computer hour' in the TV studio. The listing for this program is for the Level I or II TRS-80. There is also a sample run.

TRS-80 FEEDER DESIGN

```

10 REM FEEDER DESIGN PROGRAM
20 REM SEE "PROGRAMMABLE CALCULATOR SPEEDS FEEDER SYSTEM
  DESIGN"
30 REM ARTICLE BY BILL MARSHALL, WAYNOKA COMMUNITY TV (OK)
40 REM FROM 'CATJ' AUGUST 1977, PAGE 30
50 REM *** TRS-80 PROGRAM ADOPTED BY BILL MARSHALL & RAY DALY
60 REM AT CCOS '78
90 CLS
100 +0:D=0:T=0
110 INPUT "WHAT IS THE NORMAL TAP OUTPUT LEVEL (DBMV)";N
120 INPUT "WHAT IS THE CABLE LOSS PER 100 FEET (DB)";C
130 C=C/100
140 INPUT "WHAT IS THE AMP. OUTPUT LEVEL (DBMV)";A
150 INPUT "PREVIOUS TAP LOSS, IF ANY (DB)";B
160 T=T+B
170 PRINT" *** THE TOTAL DIRECTION TAP (DT THRU) LOSS IS";T;"DB".
180 INPUT "WHAT IS THE CABLE DISTANCE BETWEEN TAPS (FT)";B
190 D=D+B
195 PRINT "**** THE TOTAL CABLE DISTANCE IS";D;"FEET."
200 L=INT(D*C*100)/100
210 PRINT "**** THE TOTAL CABLE LOSS IS";L;"DB."
220 PRINT "**** THE TAP INPUT LEVEL IS";A-T-L;"DBMV."
225 PRINT "---THE TAP VALUE SHOULD BE LESS THAN";A-T-L-N;"---"
230 PRINT " I.E., CHOOSE THE TAP VALUE CLOSEST TO,"
240 PRINT " BUT LESS THAN ";A-T-L-N
260 PRINT:PRINT:PRINT". . . . .NEXT TAP CALCULATION. . . ."
280 GOTO 150
WHAT IS THE NORMAL TAP OUTPUT LEVEL (DBMV)? 13
WHAT IS THE CABLE LOSS PER 100 FEET (DB)? .05
WHAT IS THE AMP. OUTPUT LEVEL (DBMV)? 36
PREVIOUS TAP LOSS, IF ANY (DB)? 0
***THE TOTAL DIRECTION TAP (DT THRU) LOSS IS 0 DB.
WHAT IS THE CABLE DISTANCE BETWEEN TAPS (FT)? 1000
***THE TOTAL CABLE DISTANCE IS 1000 FEET.
***THE TOTAL CABLE LOSS IS .5 DB.
***THE TAP INPUT LEVEL IS 35.5 DBMV.
---THE TAP VALUE SHOULD BE LESS THAN 22.5---
 I.E., CHOOSE THE TAP VALUE CLOSEST TO,
 BUT LESS THAN 22.5
. . . . .NEXT TAP CALCULATION. . . . .
PREVIOUS TAP LOSS, IF ANY (DB)? 22
***THE TOTAL DIRECTION TAP (DT THRU) LOSS IS 22 DB.
WHAT IS THE CABLE DISTANCE BETWEEN TAPS (FT)? 768
***THE TOTAL CABLE DISTANCE IS 1768 FEET.
***THE TOTAL CABLE LOSS IS .88 DB.
***THE TAP INPUT LEVEL IS 13.12 DBMV.
---THE TAP VALUE SHOULD BE LESS THAN 13.12---
 I.E., CHOOSE THE TAP VALUE CLOSEST TO,
 BUT LESS THAN 13.12

```

(By the way 1k does not equal 1000, but rather 1024 which is 2 to the tenth power.) The value of the 'P' command is that you can modify the number of pages in your cycle. Fridays could have lots of local announcements, but then Mondays could be limited.

There is also a command to change the speed of the cycling through the pages. The 'T' command changes the time each page is left on the screen. Following the entry of the letter 'T' the program waits for a number which is in seconds. This delay time can be set for a minimum of one second to a maximum of 99 seconds. For operation on your system, you would want to set the time to about 30 seconds or more depending on the length of your messages. But when you are writing pages and working on the "Video Pager", you may want to set the time to 1 in order to review what you've done.

The remaining two commands allow pages to be saved onto tape. "W" command writes the material to the tape while the "L" command loads from tape into the computer memory. With the present version 1.0 of Video Pager all pages are either written or read depending on the pages specified by the 'P' command. This saves a great deal of typing in case you want to reuse pages later.

More commands may be added in later versions of this program. If you are interested in any particular option please let me know and we will see if it can be incorporated into the next version. We are presently considering allowing saving individual pages on tape, editing of pages, and exchanging pages. If there is interest we will add these features.

With this program most any size cable system can afford a community message channel. And this investment is even more affordable when you consider that this is only one application for your computer. When it was not being used as a character generator, you could use it to run programs like the one featured in last month's column on finding geosynchronous satellites. Or for one of the other applications to be discussed in this column.

This program is just one reason why a cable system may own more than one microcomputer in just a few years. This program, The Video Pager 1.0 (tm) is available from Computer Cablevision, Inc. for \$19.95. If you are interested please specify whether a Level I or Level II version of the program is desired.

There can be some drawbacks in this approach. First, the Radio Shack TRS-80 only outputs a black and white video signal. We have not tested the signal, but Radio Shack states that it is a standard video signal. Second, all microcomputers operate at such high speeds that they generate some RFI. It does not appear that this is a major problem, but again this has not been tested on an operating CATV system at the time of this writing. We will hopefully have a report on this soon from one or more readers.

Experimental TVRO Receiver with remote downconverter

The requirement for complete flexibility of receiver tuning for my satellite reception experiments dictated a system not dependent on crystals or synthesizers for channel selection, but having a single control capable of providing coverage of the complete 500 MHz band (3.7 to 4.2 GHz). The solution adopted, while a little ungainly in detail, is nevertheless a very suitable approach for the experimenter. I shall describe the way it was done in the prototype receiver at Sheffield—it will become clear as I proceed that there are areas where details could be improved or simplified. **The remote wideband downconverter** may well find favor in commercial receiver designs in the near future. Real-World-Technology are developing an improved version of the receiver to be described here, and a simplified model may make an appearance as a CATJ Lab kit later in the year.

Apart from enabling **continuous single-knob coverage of the entire band**, the principal advantage of the approach is the **saving in cost in the LNA**, and LNA to receiver cable run, where typically 50 dB gain has to be provided, plus a very low loss airspaced cable, to deliver sufficient 4 GHz signal to the receiver input socket in the conventional systems to completely override the noise of the receiver's 'front end' (noise figure order of 10 dB). Placing the first down-conversion out at the antenna with the LNA means that the signal is brought into the building at UHF frequencies—standard coaxial cable can be used and wideband gain is easily and cheaply achieved.

Choice of first intermediate frequency

In selecting an i.f., there are several points to consider. If the first local oscillator is to be fixed in frequency, then the intermediate frequency must be high enough to enable tuning of the second converter over the required bandwidth. A two-to-one range of frequencies is about the maximum that can be achieved in practice. With a 500 MHz band to cover, this means the i.f. **range must be around 500 to 1000 MHz**, or higher. A lower limit is also set to the range by the necessity of eliminating second-channel, or 'image' response. A receiver with single-conversion to 70 MHz would require its conversion oscillator to be 70 MHz high or low of the required signal frequency. For reception of say Satcom channel 12 at 3940 MHz, oscillator injection would be required on either 3870 or 4010 MHz. If 3870 were chosen, the receiver would have a second channel response at $3870 - 70 = 3800$ MHz, leaving it open to interference from the cross-polarized signal on transponder 5. Similarly, choice of 4010 MHz would mean $4010 + 70 = 4080$ MHz would be received simultaneously. **Vertical channel 19** could give a problem. If the chosen i.f. were raised or lowered by 10 MHz matters would be even worse - the

interfering transponders would then be those of similar polarization. So the receiver would have to incorporate a signal-frequency bandpass filter ahead of its mixer—not really the way to achieve single-knob tuning.

An upper limit to the chosen i.f. is not so well defined. Generally, amplification with a suitably low noise figure starts to become expensive above about 1000 MHz. Also, cable losses are increasing with frequency and there comes a point where the advantage of the lower frequency (relative to the 4 GHz signal frequency) in requiring a less costly cable run (to achieve low loss) is lost.

One other important factor is the presence of strong terrestrial transmissions within the i.f. range, which could be picked up within the system and degrade performance. Within the band of interest, the most likely cause of interference is the UHF TV broadcast band, 470 to 860 MHz. Experience has shown that, unless the terminal is virtually co-sited with a high-power TV station, 'breakthrough' can be reduced to an insignificant level by providing adequate shielding and power-supply filtering, together with a well-matched feed line with i.f. gain ahead of it; that is, in the outdoor unit. At the writer's location, the local UHF TV signals are below noise level at the indoor termination of the feed line.

The precise choice of i.f. range here was prompted by the availability of **voltage-controlled TV tuners** covering nominally 470 to 860 MHz, for an output (second i.f. in our application) centred on 36 MHz. By adjustment of the tuning elements (half-wave trough lines) and increase of the available tuning voltage from 25 to 35 volts, the tuners employed by the writer, Mullard (Philips) ELC1043/05, can be made to cover 450 to 950 MHz, requiring a first local oscillator frequency of 3250 MHz for the 3700 to 4200 MHz band. **These tuners incorporate two tuned RF stages** before the self-oscillating mixer, giving

an overall gain in excess of 20 dB. A bandpass interstage coupling sets the bandwidth at about 15 MHz, depending on tune frequency. This coupling was tightened to give a minimum bandpass of 20 MHz, so as not to unduly truncate the FM TV signal for the experimental application.

Selection of second intermediate frequency

Demodulation takes place at a fixed i.f. centered on 35 MHz, to suit the UHF tuner described above. The phase-lock loop demodulator, operated below limiting, defines the bandwidth, as previously described in this column. The level of i.f. signal applied to the demodulator is set by a two-stage wideband amplifier incorporating PIN diode attenuators, to give a gain variable from + 26 dB to -30 dB. A conventional i.f. filter may also be inserted at this point to give additional protection against adjacent channel signals capturing the loop when the wanted signal is low in level.

For high quality performance, where signal levels permitted, a change to 70 MHz as second i.f. would be worthwhile. This could be achieved with modifications to the tuner.

UHF Feed Line

About 50 ft. of standard 50-ohm coaxial cable separates the head unit from the remainder of the receiver. This run has a loss of less than 6 dB, and wideband UHF amplifiers are used at each end, a three-stage 21 dB discrete component unit at the antenna, and a 15 dB hybrid thick-film unit in the building, feeding directly into the tuner. The head unit operates from a 12-volt positive DC supply, fed along the cable.

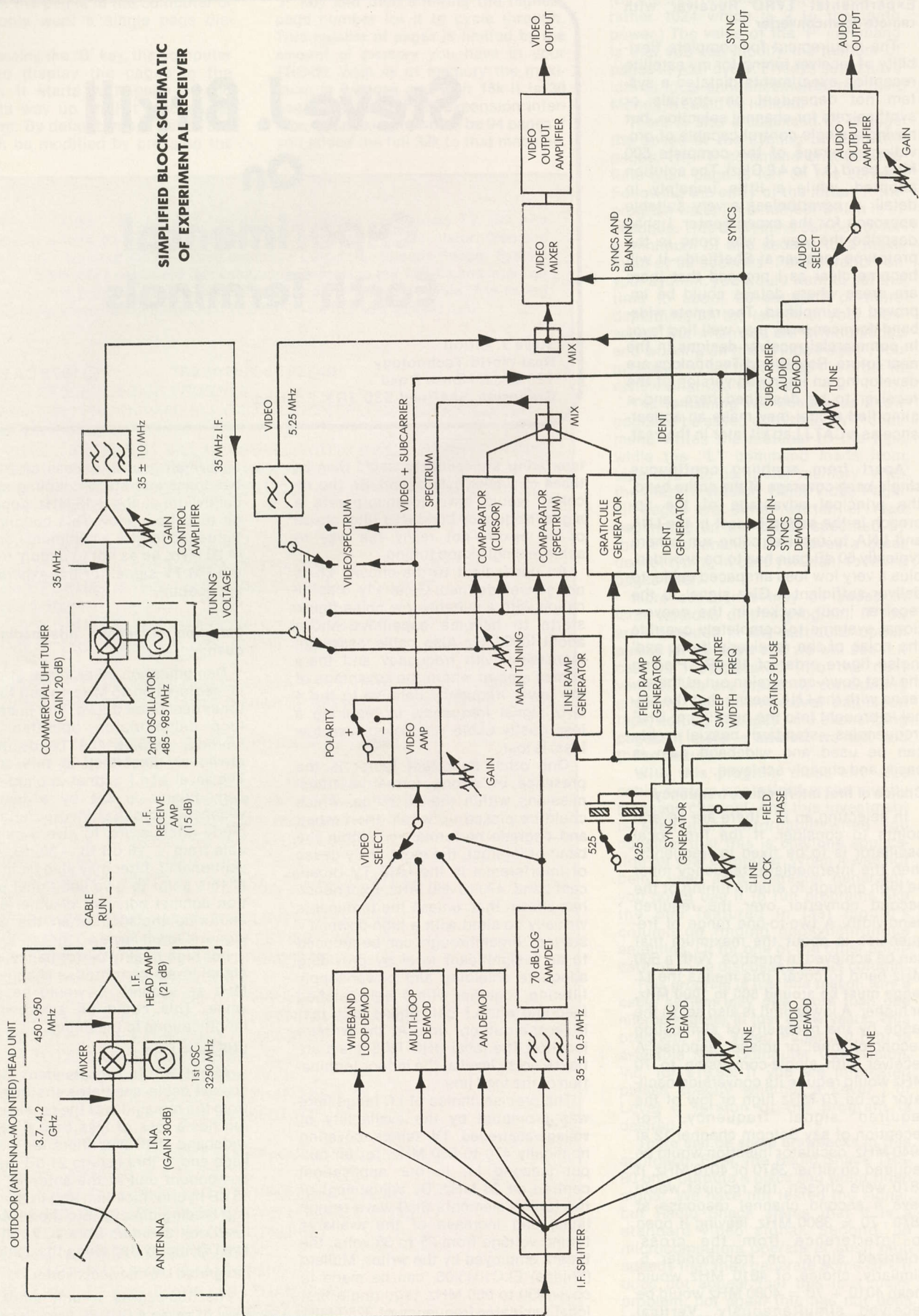
Integrated LNA/downconverter

The 185-degree K unit employs a total of **seven 4 GHz RF amplifier stages** plus a transistor mixer, to give an overall gain including conversion of approximately 30 dB. This large number

Steve J. Birkill On Experimental Earth Terminals

Steve J. Birkill
Real-World Technology
128 Cross House Road
Grenoside, Sheffield S30 3RX England

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of stages results from the use of **poor quality** (but 'available at the time') bipolar transistors in the bulk gain stages. Clearly **similar performance can now be achieved with as few as three stages.** The local oscillator is self-excited at 3250 MHz, using a similar bipolar transistor. This has proved to have adequate stability for use with the tunable second converter, in the TV reception mode. Demodulation of narrow-band (i.e. SCPC) signals would require a crystal-derived phase-locked source. Alternatively AFC could be applied to one or other of the conversion oscillators. Gain variation across the entire band is about 6 dB, most of which comes from the 4 GHz RF stages and from tracking inaccuracies in the four varactor-tuned circuits in the UHF tuner.

Other facilities provided in the experimental receiver

The most useful of these is a

spectrum analyzer, enabling the entire satellite band to be displayed on the TV screen. The control voltage terminal of the tuner is switched to the output of a 35-volt ramp generator, triggered from the field pulses of the receiver's internal sync generator. The i.f. output from the tuner feeds a 70 dB logarithmic detector, the output of which is compared with a line-frequency ramp, to give a white-to-black transition on the display. The resultant display has a resolution of about 1 MHz at maximum sweep width, and a 1 MHz bandwidth resolution filter is provided ahead of the log amplifier. This is adequate to identify transponder usage across the band. Graticule lines are generated at 10 dB intervals, and a cursor line shows the tune point corresponding to the manually adjustable tuning voltage in the demodulator mode. The display is of course 'sideways' on the TV screen to give a reasonable sweep rate; the frequency scale runs from top to

bottom and the amplitude scale from left to right.

The receiver block diagram also shows the other features of the receiver; the re-inserted syncs (invaluable for identifying below-noise carriers) are phase-locked to incoming line sync, though field phasing is manual. (ICs are now available to do both operations automatically). The opportunity is taken to insert an identification symbol in the corner of the screen. Sync lock can be derived from a second, narrow-band demodulator, independently tunable within the i.f. range. Audio demodulation is provided for subcarrier (tunable 4.5 to 8.5 MHz), independent carrier, or pulse-width (USSR-style) sound-in-syncs modulation. Video demodulation can be from the normal FM loop, from an experimental multi-loop threshold-extension demod, from an AM demod, or from the log amplifier. Inverted video can be handled.

TECHNICAL TOPICS

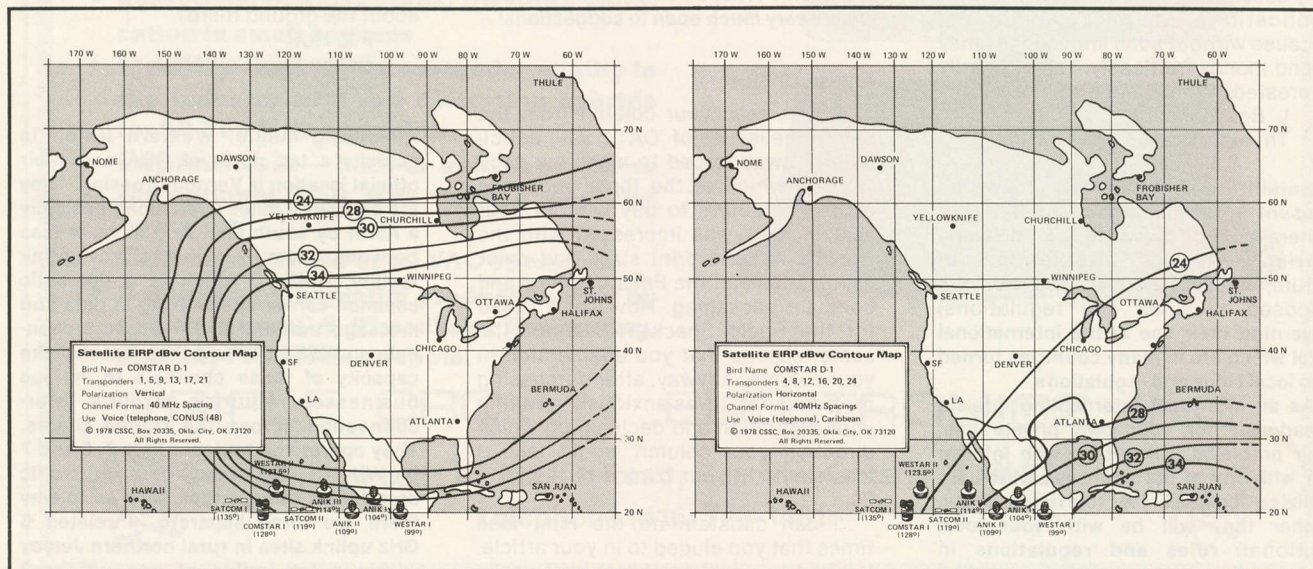
Satellite TV In C.A.

"I would appreciate information that you might have on satellite TV broadcasts to the Panama/Canal Zone area as well as into northern Columbia and what if any agreements are available for use of satellite TV signals in foreign locations."

James W. Carter
Barranquilla, Columbia
South America

The SATCOM F1 and F2 birds place EIRP's in the 23-25 dBw region into that portion of the world. At least that is what we deduce from (1) careful review of SATCOM EIRP maps, and, (2) talking with the folks at RCA Americom. We've been told that tests have been run with a 'portable' six meter terminal in the Caracas (Venezuela) area which tend to confirm the projected EIRP's we have just quoted. We know of one chap head-

quartered in Miami planning a series of terminals in Venezuela to pick up the SATCOM transmissions, primarily to feed to U.S. residents there. In addition to that COMSTAR has at least one (six transponder set) beam which places a high EIRP into that region of the world; primarily because they seek to serve the Puerto Rican region (see map appearing here). To place television programming on COMSTAR (on the appropriate an-



tenna set) would require talking directly to the folks at ATT & GT/E. Another option open would be the hemispheric (1/2 transponder) format video from Intelsat F3 (34.5 degrees west), F1 (24.5 degrees west), F2 (29.5 degrees west) and F4 (19.5 degrees west). Contributing editor Steve Birkill (see address with his column) can be helpful here. The footprint signal level available from these Intelsat birds in the hemispheric pattern should approximate the same levels you would find from SATCOM F1 or F2 far off of boresight like you would be. Our quick numbers indicate a 100 degree LNA and a 10 meter dish would get you into the 48-49 dBw region with video signal to noise; out of the sparklies but no real margin.

Now as for 'agreements' to use the signals. We think your chances to get 'permission' from Intelsat are at best poor although you might have some luck with the TVE group in Madrid, Spain and their Canary Island feed (again, contact Birkill). As for the English language programmers using SATCOM... there is no harm in asking them although we point out our FCC licenses these birds as 'domestic' satellites and Barranquilla, Columbia is 'stretching' the normal meaning of 'domestic' just a tad!

Satellite TV In Malawi

"I am living in a country with no television network but using long distance television receiving equipment I have been able to achieve a measure of success. As there now exists the possibility to receive satellite broadcasting on a low cost satellite TV station, I would like to ask your assistance and advice.

- 1) What are the legal aspects involved in receiving such broadcasts?
- 2) What conditions prevail with regards to receiving such broadcasts?

Despite the low cost equipment now available and the possibilities to receive satellite broadcasts I feel it is very essential for me to know the legal implications of my commitment because without such knowledge I may spend money fruitlessly. I am primarily interested in the Intelsat satellite(s)."

L. Bruzziches
Thyolo, Malawi

Satellite TV broadcasts from the present Intelsat series satellite are generally considered to be 'common carrier' (although international in nature) signals. There are 'policies' (as opposed to rules and regulations) governing their use at the international level which are in many countries turned into local rules and regulations.

As an individual intercepting Intelsat broadcasts for your own private use, your problems will not be with Intelsat nor with any of the countries which are utilizing Intelsat for television relay. Rather they will be with your local (national) rules and regulations in Malawi. If, upon inspection, you find

there are no national rules, regulations or laws within Malawi to prohibit you from building a (low cost) satellite terminal and using it for your own private purposes, you can be very sure that your investment will not be in jeopardy. When you get it running... send us some photographs of the terminal and the reception!

A Changing World

"I first subscribed to CATJ about three years ago. At that time the Journal had mostly articles pertaining to the technical aspects of the cable distribution system. For the past 12 to 18 months the Journal has printed very few articles about anything other than satellites. I think there is more to the cable than satellites. I am hoping the Journal will start presenting a more balanced coverage of the cable industry".

R. Zahniser

A most difficult problem. The first three plus years of CATJ dealt largely (as you suggest) with 'cable basics.' In fact, if you took all of the first 32 or so issues and packaged them together you would have a dandy handbook of cable. Virtually a complete reference manual from antennas to taps, power supplies to antenna site calculations. Then satellites hit. Economically, we believe satellites are changing CATV so rapidly that within another couple of years the cable industry will have very small resemblance to the cable industry of say 1975. But, as you note, even with satellites you still have to design, build and operate a 'terrestrial cable distribution system' to make the satellite signals useful. Unfortunately very little has changed in the terrestrial end of cable in the past few years. Amplifiers today are largely the same amplifiers of 1975. Taps ditto. Cable ditto. We reached state of the art (or close to it) in that end of the industry about 1975 or 1976. And therein is the problem; do we re-hash 1975-76 again and again? What do other readers think? We are very much open to suggestions!

A Wise Choice

"I have read your column from the past three issues of 'CATJ' with anticipation. I was forced to make my decision on which of the three appliance grade computers to buy without your assistance. I was impressed with the Apple's variable print sizes and color capabilities and the Pet's graphics and compact packaging. However, I opted for the Radio Shack TRS-80 for the same reasons that you enumerated in your column. Anyway, after purchasing my computer, I was anxiously awaiting your evaluation and decision on which direction your column would take. I was elated at your choice of the TRS-80.

"I can substantiate the long lead times that you eluded to in your article. I've had my Level 2 on order for 7 weeks

and haven't received it yet. I have waited for my 'TRS-80 Technical Reference Manual' so I could try to use my machine as a character generator. I would enjoy something of this nature in your column. I visualize using a machine as a date/time generator, weather/wind speed generator and advertising/information system on an unused T.V. channel. Advertising tapes could be preprogrammed and run on a scroll or roll up program. An MSO could use MODEMS to transmit records from each system to a central office via phone lines saving clerical costs and telephone charges. I'm looking forward to your column developing some software for record keeping, bookkeeping, install and work order, system design, billing, accounts receivable and accounts payable, etc. Another possibility would be weather equipment peripherals. I hope this is of some value to you.

Jerome Mangen
Meade Cable TV
Meade, Kansas
67864

Contributing editor Ray Daly is a step ahead of you Jerome. In his February column he described the 'electric pencil' program which allows you to utilize your TRS-80 for creation of character generator video messages. We agree with you that the use, by even the smallest systems, of the versatility of a personal computer package like the TRS-80 can be almost unlimited. Cable's role as a communications medium can only be enhanced by the addition of computer memory controlled local video generation systems.

All In Jersey?

"I was intrigued by the December issue report on the health of F1/2 and the comparison between the RCA and Western Union operations. One thing puzzles me; what possible advantage is there for RCA and Western Union to both be located at Vernon Valley in New Jersey? Is there something magic about the ground there?

J.L. Hoff
Escondido, California
92025

Nothing magic. Western Union is actually a tad north of RCA and their official location is Vernon Crossing. They are perhaps 3 miles apart along basically a north by south line. And more or less between them is yet a third uplink facility; AMSAT which is a domestic common carrier specializing in data and message traffic. AMSAT leases 3 channels on WESTAR I and then 'resells' the capacity of those channels to various businesses requiring satellite interconnection across the United States. They operate on transponders 3, 5 and 7 on WU 'I' with some additional traffic on a fourth transponder. Now as to why there are three separate, unrelated 6 GHz uplink sites in rural northern Jersey within a few miles of one another?

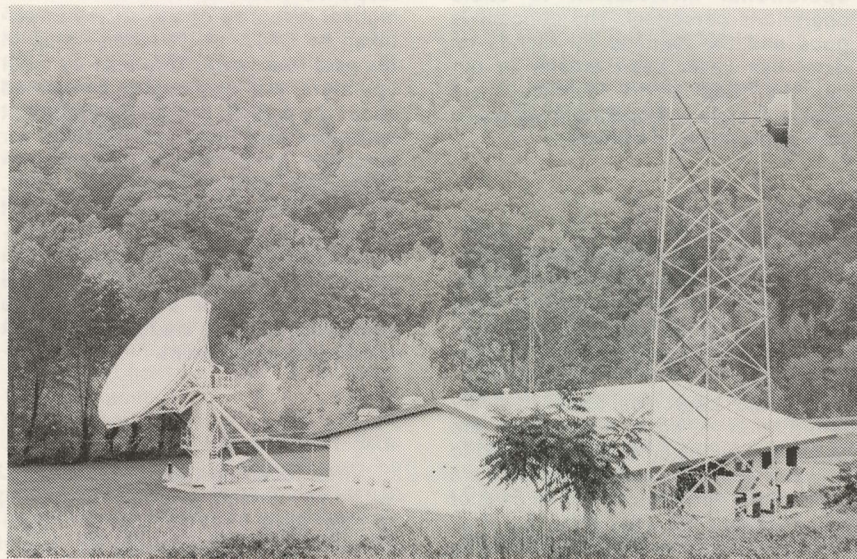
Because the valley they are in is the "first valley" west of New York City's metro area which has a clear shot at the orbit belt (70 west to 136 west) and is also outside of the high microwave RF pollution that exists in the metro area itself. Next question.

Mending Fences

"Being a hardware man at heart, a Ham (WA3TRS), and having a deep respect and love for the cable industry, I can say the following with no qualifications: CATJ is probably the best CATV engineering magazine around, especially since my picture appeared so many times in your February '77 issue!

"Since you have brought satellite communications technology down to earth, where it belongs, I cannot wait for each issue to arrive here at NCTA. My engineering career started in the satellite business and continued for eleven years at COMSAT Labs. So, is it any wonder that I ask 'Is there any other way?' Keep up the good work.

"The engineering department of NCTA is publishing a technical 'rag' called **Tech Line**. Enclosed is a copy of our premier issue and you will note the short article format. As it becomes more widely read, I hope to establish a Q and A column. From time to time there may be an item of interest that you may have published, which NCTA engineers



AMSAT UPLINK - VERNON VALLEY

and technicians should know about. I am not talking about big feature articles but rather bits and pieces.

"If the occasion should arise where it would be useful to publish some of your (CATJ) material in **Tech Line**, we will call you for permission. I recognize the separation between NCTA and CATA, but we do seem to be striving for the common goal of the best cable systems in the world.

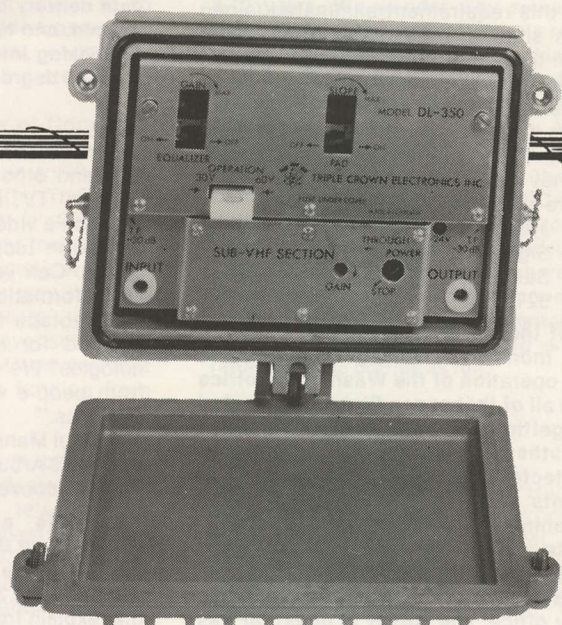
"Accordingly, when it is in the best interest of both associations, I invite you to contribute to Tech Line. It seems that, when Bob Cooper speaks, everyone listens."

David G. Reiser
Asst. Dir. of Engineering
NCTA
Washington, D.C. 20006

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operational information to cable operations personnel. The concept is good and the demand for 'hands on data' has never been greater in our industry. 'Real world' techniques are always in style and operators are urged to support this NCTA effort.

Marching Around

"Enclosed is the equipment delivery time survey form you asked CATA members to fill out. I started to write you a note on the back of it and then changed my mind; I'll write a letter instead.

"I could care less about delivery information. I know that there are delays on some items. I have learned to live with them, or know where there are other sources that I can use in case of an emergency. So what is the use of all of this information (CATA) is trying to compile?

"I consider this project just so much marching up and down the parade ground. You are not going anywhere!

"How about directing the attention and resources of the Association to a subject that concerns a great many of us. That of blackout protection. Right now I understand the FCC is considering the problem of syndicated exclusivity. Why not work on that one?

"Right now we are serving 880 subscribers. In about another year we will pass the 1,000 mark and will have to start providing this service as requested. I think it makes more sense to do something concrete about trying to get this requirement eliminated (along with simultaneous duplication) rather than tell me that the delivery on directional taps is now running 15 to 30 days. I already know the delivery on the taps, so don't spend money telling me what I already know. Spend some money to help me make my service more appealing to my customers."

Jonathan Lippitt
Signal Master
San Diego, Ca.
92108

Of the total CATA budget, 61.5% of the money available goes directly to the operation of the Washington office and all of that expenditure is dedicated to getting the FCC off of your back Jonathan; and keeping your flanks protected from unnecessary encroachments into your business by well meaning but often misguided bureaucrats and law makers. Another 18.5% goes directly into support of the Washington office, from the Oklahoma City office. The survey in question was hardly needless "marching around the parade" field as you suggest. As the feature report in January's CATJ details, an operator unprepared for massive delays in equipment deliveries or an operator not prepared (through proper financing of his operations) to 'play the game according to the new rules of supply and demand' will find himself unable to supply an appealing service to his customers. The survey in question brought in better than a 70%

response from CATA members; the highest response of any survey undertaken by CATA of its membership in the past four years. This tells us most operators are very much concerned about the present crunch in equipment deliveries and they are looking for guidance in working out their own equipment delivery needs for 1979. With 80% of the total CATA budget directed at Washington, the 20% remaining for non-Washington problems must be carefully parceled out. We think our attention to the equipment delivery snafu will turn out to be a wise investment.

YUP — It's There!

"After receiving the November CATJ with the interesting article on finding Intelsat birds I noticed that the appropriate Az-E1 coordinates for Miami were given for the Intelsat birds in the eastern sky. So I went out into my yard and cranked around on my ten foot Anixter-Mark dish (equipped with a 120 K LNA) and sure enough...there were a couple of Intelsat birds right where they were supposed to be! Now that I have discovered they are there I am anxious to have Steve Birkill tell us how to modify our discriminators and other after-IF functions so I can resolve the signals that are present."

B.B.
Hialeah, Florida
33012

Birkill promises to speed up the rate of data delivery through his CATJ monthly column, and to share his own technique for making Intelsat pictures play on his own 180 degree K LNA / 8 foot terminal.

New Cable Technologies

"I and others at a local community service TV station would like to produce a video tape on the new cable television technologies such as fiber optics. Can you advise me if there is any information available such as film or videotape of the actual equipment planned for use in these new technologies? We would like to hear directly from people who are in a position to assist us."

Paul Manning
4426 Arbutus Street
Vancouver, B.C. V6J 4A2

That is an intriguing thought. Someone out there really would be doing the industry a service if they sat down and prepared 30 to 60 minute videotapes that explain from basics forward (1) fiber optic transmission systems, (2) security systems via two-way cable, and (3) the omni-present satellite TV service via DOMSAT birds. It is not a small-bucks project but to the group or company innovating in this area would go the applause of the industry and frequent use and re-use of such programs at state, regional and national association meetings. We'd even like to air such product on our SATELLITE MAGAZINE program!

Telesat Replies

"I am writing in connection with the article which appeared in the October edition of CATJ entitled, Update '78, and particularly the latter portion of the article which follows the sub-head, 'And in Canada'.

"I did not read the article until mid-November, having been at Cape Canaveral arranging for the launch of Anik B. At that time, because the launch had slipped to mid-December, I just did not have the time to write about it. I decided that I would let the matter go as it was, by then, late to respond.

"Unfortunately, however, in mid-January excerpts from the article were picked up and commented on by a major Canadian newspaper, the **Winnipeg Free Press**. We have written the author, complaining about the rather sloppy way he based his comments on a single source, the CATJ article, and made no attempt to contact Telesat to check his facts, even though it would have been easy to do and he certainly had the time.

"Having gone that far, I think I should also write you to express the same complaint.

"Needless to say you have a right to any opinion you have on Telesat. When you publish that opinion, and base it on statements of 'fact', it is irresponsible journalism not to make every effort to ensure that what is stated as fact, indeed is. My complaint is that your sources, with the exception of an unnamed 'former Telesat employee'—a dubious authority one would think—appear to be cable operators with axes to grind. The result is a rather biased, one-sided, and in many places inaccurate presentation of the facts.

Page 18, para 1, lines 2-5

"Three birds in the sky is correct, as of October 1978. One, Anik A-1 was within a month of the end of its service life; Anik A-2 was within five months of the end of its service life; Anik A-3, the primary service satellite, is more than half way through its service life. Together they provided a total of 30 RF channels for commercial use.

"Three channels of television (CBC) correct—but three other channels on a second satellite required and earmarked by contract to provide protected service to the CBC in the event of a failure in the primary satellite. Therefore, a minimum of six channels must be allocated and available to provide CBC protected service. In addition, the CBC currently contracts for an occasional use channel for news-gathering, packaging national news and public affairs shows and to carry special programming originating in parts of the country other than the major cities in the south. This channel is almost constantly in use and it will soon be more efficient for the CBC to lease it outright than to continue the present arrangement. So at present, a minimum of seven channels are occupied with TV programming, not three as you state in your article.

"TV, of course, is only one of the telecommunication services carried on our system. Providing protected service to such customers as Bell Canada, the TransCanada Telephone System, Canadian National Telecommunications, and Teleglobe Canada accounts for a further 11 RF channels on the satellites. Thus, of 30 channels available for commercial use in the three Anik A series satellites, a total of 18 is fully committed to providing service,—more than 50 percent of total capacity. Not quite the 'embarrassment of riches' or the 'embarrassment of poverty' implied in your article.

Page 18, para 3, lines 5 to end of para

"What your story does not point out is that Anik A-1 completed its **six-year service life** in November 1978 and Anik A-2 will reach the end of its service life in April of this year. They are being replaced by the 12, 6/4 GHz channels in Anik B. I've already explained that A-2 was used to protect the primary service on A-3 under the terms of our customer contracts, therefore it was very much "in service". A-1 has been used for a variety of special, short term uses for our customers; has provided experimental service to the Canadian Armed Forces and is **contractually available to RCA's Satcom system** for emergency back-up service restoral. So it too, is doing more than just 'occupying space and holding down an orbit spot'.

Page 18, paras 5 and 6

"The statements in these two paragraphs reveal a complete lack of understanding of the conditions in Canada and the use being made of the system. The editorial comment about 'bungling leadership' or being a 'deeply entrenched bureaucracy' is nonsense.

"The Telesat system has made reliable, modern telecommunications available for the **first time** where heretofore they were physically impossible or economically impractical. They **have indeed** provided service where none previously existed. They also provide alternate and additional service to other parts of the country where services do exist. They were planned, designed and built to do that at the **specific request of the customer**.

"I suspect that our (or any management) could rightly be accused of 'bungling' if it chose, deliberately, to contravene the provisions of the statute under which it was chartered. The Telesat Canada Act, which is the law of the land for satellite operations in Canada, is quite specific on what Telesat shall and shall not do. **We too, find some of the provisions constraining**, but failure to abide by them, like it or not, is an infraction of the law of the country in which we operate. There is a strong possibility that that law will be amended in the near future. If, as and when it is, Telesat's policies will reflect these changes.

Page 19, para 1

"The statements made in this paragraph are totally wrong.

"First of all, Telesat does not 'put in' any earth stations 'on its own'

anywhere or for anybody. The nature, location, number and type of earth stations installed by Telesat are governed by the services for which the customer contracts.

"Your example of the Yukon situation is highly inaccurate. In fact, in 1973, on orders of the customer (CBC), Telesat installed earth stations in the Yukon communities of Clinton Creek, Dawson, Elsa, Faro, Watson Lake and Whitehorse. None of these communities had live network television prior to the establishment of these stations. Some of them, including Whitehorse, aired four hours a day of delayed, bicycled tapes to their viewers on the CBC's Frontier Service. In Whitehorse, a local cable operator provided additional service to its subscribers by airing programs taped earlier in Vancouver and flown up to Whitehorse by air freight on a more or less daily basis. The Clinton Creek station was shut down and removed in 1978 when the Clinton Creek mine closed down. In itself this closure was evidence of the flexibility and efficiency of the system. At minimum cost, services were made available by satellite as long as there was a need for them. When the need disappeared, the station was removed. No costly chain of permanent terrestrial transmission facilities was left behind to rust.

"As the voice of the cable industry, it is expected, right and proper, that CATJ should push the views and interests of the industry it serves. In my opinion, it is quite improper to do so on the basis of one-sided, and often totally inaccurate 'facts', especially when the other side of the story is so readily available.

"Mme Sauve, Minister of Communications did not send us five proposals instructing or advising us to re-structure our policies or tariffs. The statement attributed to her in the 'fifth proposal' seems to imply that she, or the Department of Communications or the government in some way rules on Telesat's 'budget requests'. Telesat does not now, nor has it ever submitted its budget requirements to government and Telesat receives no funding from any government body.

"Finally, Rod Wheeler's belief that he will provide the residents of Faro, Yukon, with 'their first television' is puzzling. Faro has received CBC network television since 1973 via Telesat's system. If he refers to distributing signals picked off U.S. satellites for his subscribers, I'd be very surprised if he does it with the 'blessing of DOC' under present conditions. Time will tell, I guess.

"Surprising as it may seem, this 'bungling' and 'deeply entrenched bureaucracy' knows a little bit about the business it's engaged in and the laws that govern its operations in Canada even if they don't meet with the full approval of the cable operators

here. We've even been known to do a little planning from time to time."

F.M. Steers
Director, Information Services
Telesat Canada
Ottawa, Ontario

Mike -

You have properly taken us to task for having previously properly taking you to task. Consider us about even. Cutting through all of the language, ANIK still has no cable programming channels available. The cable industry in Canada, we feel, has made several very deliberate attempts to work out an arrangement to utilize ANIK for such program relay. We understand that Telesat has quoted Canadian cable interests transponder rates as much as 300% higher than identical SATCOM rates in the United States; plus, there seems to be some difficulty with who will own, install and operate the earth terminals. You suggest Telesat operates under the Telesat Canada Act and you conduct your affairs accordingly. Obviously the law needs to be changed.

Nit-picking. . . we are surprised to learn that Telesat 'writes off' ANIK birds in six years. We doubt Hughes (who built the satellites) would like that spread around since they typically talk about an eight to ten year life. Strange that the WESTAR satellites are almost identical to ANIK (both being Hughes HS-333 design satellites) yet they have a forecast life of 8-10 years. We wonder why somebody might be tempted to 'prematurely retire' an operating satellite; seems kind of wasteful to us. Of course we didn't include the three back-up channels on ANIK-2 (for the CBC services on ANIK-3) in our 'count' of transponders in use; anymore than we counted the 11 transponders on ANIK-1 which RCA has a hold on as emergency backup for the failure of a SATCOM bird. We advocate and approve the concept of spares-in-space but to count the spare-channels as 'active' seems like taking inventory at the Super Market and counting empty-returned Coke bottles as full.

Hughes April AML Seminar

A 'full house' at the January Hughes Microwave Communications Products Torrance plant seminar on AML systems has brought back an additional scheduled date for another seminar. Originally Hughes intended to run their next AML seminar later in the year; but the large number of people who wanted to attend the January meeting suggested to Hughes that they should move the second seminar for the year to April 2 through 6. The event will be held at the Torrance, California facility and advance registrations are mandatory. You can make reservations by contacting Hughes Seminar Registration, P.O. Box 2999, Torrance, California 90509 or call (213) 534-2146.

Coop's cable column



bob cooper editor in chief
CATJ

Keeping Private Terminals Out of Trouble

The FCC says they would like to get out of the business of requiring licenses for TVRO (satellite) terminals (see Satellite Technology News, this issue). Or, to be more precise, they'd like to offer an 'option' to people putting in terminals; either they can follow the present format with frequency coordination, rain scatter studies and the whole nine yards and get a license. . . or, they can simply put it in and 'register the terminal'. If you elect the first option, the present system, the FCC will provide 'protection' against interference to your terminal in the years ahead. If you take the second route you are on your own. Today, tomorrow and forever.

I think this is a good idea. And it should be approved. But with approval comes a new problem; that being, how do you insure that there is only legal use of the satellite services by duly authorized receiving terminals?

Under the present system if you get a license, they know where you are and who you are. They also know what services you are authorized to be carrying. When a terminal is granted a CP to construct usually the service(s) you will be receiving file a "214 Authorization Request" with the FCC. That tells the Commission who is actually doing business with whom via satellites. And the only way that operations like Southern Satellite can stay legal (they too are licensed) with the FCC is to specify each and every receiving point for their services.

What about the rancher in Wyoming who buys a terminal from (say) Cliff Gardiner's Houston firm? How does he get into the 'stream' with the folks from HBO or SHOWTIME or SSS? What happens if he simply ignores this aspect of owning a terminal?

Because satellite television service is not a 'broadcast' service (in the sense that local radio and television stations

'broadcast' to the public at large), a private terminal cannot legally receive the broadcasts without specific authorization from the program services operator. In some cases this is simply a letter changing hands. Trinity (14), PTL (2) and CBN (8) welcome any and all viewers and they don't charge a dime for granting a 'letter of authorization' to access their satellite signals. I've even had a few timid letters from would-be private terminal operators asking us to grant such a letter for accessing the 'SATELLITE MAGAZINE' program we send out via satellite each week.

Next up the Ladder are the broadcast signals relayed via satellite. WTCG, WGN, KTVU start out as 'in the air' public domain services. When they are taken 'off air' and sent via satellite, they become 'common carrier' signals. In theory they are no longer in the public domain. Certainly Southern Satellite Systems or United (the two carriers involved) can prove they have costs involved in the relay of these signals via satellite. But I doubt they would want to prove they have any 'property rights' to the programs themselves; the Copyright Law would hang them if they did. SSS and United get a dime a month a home for cable viewers; which is \$1.20 a year. Kip Farmer of SSS tell's me that SSS has a minimum 'billing' of \$5.00 per account so in effect our rancher in Wyoming could be a 'legal' watcher of WTCG for \$5.00 a year. KTVU and WGN would probably be the same way.

At the top of the ladder we have the premium television services; SHOWTIME, HBO, FANFARE, STAR CHANNEL, and HTN. Their rates vary like their services; from under \$2.00 per month (HTN's mini-service) to around \$4.50 a month. Most of us understand that the programming companies providing these services via satellite don't own the programs (by in large)

they televise; they are merely renting them for a period of time. The 'owners' of the programs (movies typically) charge the SHOWTIMES of the world so-much per-film (program) per-home reached. Cable systems count heads when they collect premium-television dollars and these dollars and the head count winds it's way back to the film rights owners via the satellite programming company. In theory the programming reaches no one who does not pay for it.

Except our rancher in Wyoming and the thousands of others like him (I said thousands and I mean thousands). If you have trouble with the thousands-quantity stick around 12 months and it will be much-much bigger. If you don't believe so, come answer our telephone for a day; we average 40-50 calls and letters a day from individuals interested in building or buying their own private terminals. If I wasn't such a highly principled journalist I could 'blow your mind' with some name dropping of very-very prominent folks in the entertainment and political arena who already have private terminals. Not to speak of our Wyoming rancher and his neighbors.

Now seemingly 'stealing' FANFARE's showing of *Smokey And The Bandit* is one of those almost victimless 'crimes'. FANFARE doesn't lose anything directly because the Wyoming rancher lives 50 miles from the nearest cable system anyhow. The property rights owners for 'Smokey' don't lose anything because the rancher has to drive over 100 miles one way to find a movie theater and the last time he did that was to watch Clark Gable in 'Gone With The Wind'. However, suppose the rancher wasn't a rancher but rather he was a private individual in say Palm Springs, California. Somebody with access to cable, access to a premium television channel, and access to the local movie theaters. Now our victimless crime has a victim. Several of them as a matter of fact.

As private terminals grow (and the FCC's proposed rule change certainly isn't going to hurt their growth) the problem grows too. Now—how do we keep the private terminal act from spoiling the cable use of the satellites? Certainly there will be 'critical mass' point of private terminals after which the movie rights owners are going to come down on HBO et al with both feet 'demanding' that HBO (et al) install some type of security system to 'protect the integrity' of the movie rights. When you rent an apartment you agree to return it to the owner in good shape and without damage. The same principle applies here.

The uplinks could be scrambled. Probably not at WTCG, WGN or KTVU. Surely not at PTL, CBN and Trinity. But probably at STAR CHANNEL, HBO, FANFARE, and SHOWTIME. They wouldn't have much choice; either they do it or they find the movie people very hard to get along with; ultimately no movies would be available to them.

This scenario will cost us all money. And it can be avoided if several things are done now and a foundation is put in place for what promises to be a very substantial growth in private terminals. Naturally I have a few suggestions in this area.

- 1) **There are two classes** of private terminals these days; the guys building their own out of junk radar parts and modules from outfits like San Jose's Microcomm, and, the guy going to Cliff Gardiner (or Hughes, etc.) and ordering a turnkey. I don't know what to do with the backyard experimenter so let's just ignore him for now. I don't think he is our ultimate threat anyhow.
- 2) **The turnkey buyer**, on the other hand, can be identified. At least one person knows about everyone of these; although it is not always the same person who knows. Who's that? The guy that sells the gear.
- 3) **Every private terminal operator** I have ever talked with (and they number in the hundreds and perhaps thousands) will sooner or later get around to asking me if I can supply them with the 'program guides' for (and they rattle off a list). With one exception I have simply said no. The exception is a close friend here in Oklahoma City and I guess I am a party to his theft for my indiscretion.

Let's face facts. Having 20 channels of satellite television is a ball. But after the first couple of days of dial twisting wears off the naked realism that you are a spectator in a sport with 'no rule book' hits pretty hard. After you catch the last half of several movies you would have loved to have seen in *total* or learn from a friend that you missed an exciting basketball game on Super 17, you begin to figure out that it would be pretty handy to have a program guide.

Is there a marriage here? A solution to the upcoming problem? I think so.

First of all, I propose to start a **"Satellite Programming Registration Service"**. This will be a pain in the neck for a year or more but eventually we might even make some money at it. Here is how I propose that it will work:

- 1) **I am writing to each turnkey supplier of TVROs** asking them to **voluntarily** agree that when they sell a terminal to a non-cable customer that they automatically tack onto the package the **mandatory selection** of one or more of the 'premium satellite services'. The TVRO buyer will have a selection of programming guides and he will select which 'premium services' he wishes to sign up for. He'll sign up for one year and he will pay a set fee to the terminal seller at the time of installation for **one year in advance**. That fee will come to SPRS and we'll 'certify' the contract for one year of service.
- 2) **We'll act as the terminal operator's agent** to 'register' him with

the appropriate premium service channels (and the indies selected as well).

Why couldn't the terminal operator do this on his own? Because none of the premium service companies we have talked with want to fool with individual ranchers in Wyoming. It cost HBO more to draw up a contract with the rancher than the rancher would pay in for a year. So HBO (et al) will draw their contracts with SPRS and we'll count heads for them and pay them a full year in advance per registrant.

How do you get the rancher in Wyoming to do this?

First of all, if the suppliers cooperate they will **insist** that the rancher sign up at the time of purchase. No supplier can afford to have his name dragged through the mud at the FCC or in civil suits in court for 'looking the other way' while the rancher (his customer) 'steals' signals. **I think they'll cooperate** and the modest cost of the year-in-advance fee won't amount to a nat's leg when added to the total terminal price. No, this is not the same situation as a hand gun sales center owner being 'innocent' of being complicit to a customer shooting his wife with a 38 pistol he bought from the store owner. The TVRO sales firm **knows the law** and unlike the hand gun buyer the terminal operator most certainly is **going to tune in** proprietary signals with his terminal. If he wasn't, why in the heck would he be buying it in the first place?

Not strong enough? Think we need some incentive? I have some. Back to the program guides.

When a terminal operator registers his service selections with us, we see that he gets the appropriate program guide(s) each and every month. If he buys FANFARE, we'll see that he gets a FANFARE schedule. Ditto WGN. And so on down the line. That means he gets a 'rule book' each and every month and anyone spending 12 grand or so on a private terminal is not going to object to spending another five to twenty bucks a month to keep his 'rule book' up to date. It's possible that even some of the experimenter folks building their own terminals will **voluntarily sign up** for this just to get the program schedules.

What does all of this do besides create a new giant headache for me each month? It gives the satellite program suppliers something to hand back to 'Hollywood' when the movie folks come calling. It says that the industry has recognized a potential problem and has created a mechanism to control the problem. It says we are not turning our heads the other way and ignoring the problem.

A foolproof system? No more so than our national 55 MPH speed laws. But unlike the national speed laws, this one should have a high degree of 'voluntary compliance' at the funnel point; the terminal suppliers. I really don't think any supplier wants it to get out that he is selling private terminals **without** insisting that the terminal buyer sign

up for at least one premium service through SPRS.

Where to next? I'm out trying to get the paperwork together to work with the TVRO suppliers, on one hand, and the program suppliers on the other hand. As we progress I'll keep you advised.

Cool It

I early mentioned that we average 40 to 50 telephone calls and letters a day from folks interested in getting their own terminals. I do not exaggerate.

Yes, I'm responsible for much of this. I wrote a dumb article in **TV GUIDE**, I appeared on the **CBS Evening News** and now I've written 9 more articles for large, mass circulation magazines. It will be hard to escape my 'missionary message' on private terminals in the year ahead.

So don't take pity on my telephone or mailman. I did it to myself. However, in the process I've dragged a bunch of 'innocent people' into the same trap as I now find myself in. **H. Paul Shuch of Microcomm** (14908 Sandy Lane, San Jose, California 95124) is one of those guys. H. Paul offers completely built and tested modules which if you buy the full set can be 'plugged together' to make up a very snazzy TVRO receiver and LNA. H. Paul asks us to 'turn off' the spigot.

Microcomm is a small outfit. Mr. Shuch is a very well known microwave engineer. His small firm builds some of the highest quality 1.691 GHz WEFAX (etc) weather satellite gear in the world today. Building 4 GHz receiver 'modules' is a natural for H. Paul. Answering the telephone at 6 AM California time or 10 PM California time, and every ten minutes in between day in and day out is not Paul's bag. He says that if people don't quite bugging him about why he designed 'this circuit that way' or 'that circuit this way' he is going to quit answering the telephone. He also says he is several weeks behind in his R and D projects (which when finished I feel will turn the private terminal world upside down) because he has to spend all of his time on the telephone "giving out free lessons in microwave technology". Just for the record H. Paul asks and receives \$600 for a two hour speech on microwave design techniques these days so the guy that bugs him on the telephone is really getting \$5.00 worth of 'free' information a minute.

So lay off of Paul guys. Don't call him. Just send him a dollar for his Application Note Number 3 and enclose a self addressed stamped envelope. Read that over and if you are really serious about ordering some of his modules, do so in the mails. If we don't leave Paul alone he'll never get the 'MARK-4' version of low cost TVRO receivers finished and then we'll all be sorry!

THE LAND THAT NEVER WAS

Once upon a time (as in all classic fables) there was a magic land of "Open Access"; a land wherein every person

of every persuasion and avocation had unlimited access to all that there was and all that was known by any and every one concerning any and every topic and endeavor.

In this "Magic Land" each and every person was plugged into a nationwide grid of cables and wires and amplifiers, and at many locations throughout this land there were computer terminals and memory banks filled to giga-bit capacity with endless streams of data and knowledge. In turn, each of these regional storage centers was interconnected with all other regional storage centers and they in turn were interconnected via a master "trunk cable" to one all knowing, all knowledge, all capacity and all powerful master computer housed in the capital of this "Magic Land."

To "access" any fact, trivia or important, required only that the citizen of this "Magic Land" interconnect his own personal keyboard transponder at any of his community's plug-in "access" points, and transmit his knowledge request. In this "Magic Land," when each individual was created, he or she (or it) was assigned a personal keyboard transponder. Each keyboard transponder carried its own personal automatic identifier and when the transponder was interconnected to any part of the national grid of wires and cables and amplifiers, the interconnection was automatically recorded and dutifully stored and "Open Access" was then available to the transponder operator.

In eons past, as this system had developed, and the first crude hand wrought and belt-loop carried keyboard transponders had become available, there had developed the inevitable black-market in transponders. At first only the very affluent could afford the transponders, and the operators of the nation's earliest grid of cables and wires and amplifiers were very cautious about who received a terminal and who did not. In the very earliest days of the system, possession of a terminal transponder instilled great, immediate and profound powers to the hands of the user; for with the terminal, and with the companion "access" to the national grid of interconnected cable, wires, amplifiers and computers, even the most mundane of persons became a giant amongst all men. For then, as in all times past, knowledge was power and with a terminal there was virtually no knowledge which was inaccessible. One had to but ask, through the transponder terminal, the question... and the answer would spew forth for as long or as short a time as required to fully and completely provide the keyboard operator with all of the nation's knowledge on that particular subject.

And so it developed that the first terminals had been utilized as serious research tools in the hands of the scientists of the nation, but within a short span of a generation the terminals and access to the grid network system itself grew into a status symbol of the affluent and the powerful. And for

several succeeding generations the terminals (which steadily improved with every passing decade, as did the national grid of wire and cables and amplifiers and computers to which they all interconnected) gradually evolved into more and more efficient tools. Each new generation succeeded in making the transponders smaller and smaller, and in increasing the capacity for storage of knowledge and the speed by which this knowledge could be "accessed." And this development of the system had created a real fear amongst the elitist users and the powerful operators of the system that black market transponders were falling into the "wrong" hand; they were being utilized by "unauthorized" persons who did not have the necessary "prerequisites" to own or operate such units or to access the then private all powerful, all knowing knowledge system.

And so it came to pass that the elitists and the system operators appealed to their nation's governing body for help with this problem; and they asked their government to pass laws which made it a capital offense, punishable by the most hideous of all punishments, for any person to own, or operate, or have in their possession, or to conceal from the proper owner any keyboard transponders. And the government itself largely dominated by the same elitists who profited from and benefited by the operation of the system obliged. To mis-use, in any way, a keyboard transponder was a crime punishable by not less than 100 nor more than 1,000 back-to-back forced viewing of then centuries old videotaped re-runs of Barbara Walters news programs.

Faced with such a terrifying reprisal the black market for unauthorized transponders disappeared almost immediately. And thereafter for yet more generations the elitists prospered; and the nation grew further and further apart. Those individuals who "qualified" for a transponder became ever more wealthy and ever more powerful; and those who did not have the necessary prerequisites... well, for a shaky century or more this nation went through upheaval after upheaval so that ultimately it became a nation divided. Sabotage of the national grid of wires and cables and amplifiers became commonplace; so commonplace that for a decade or more the operators of the knowledge system embarked upon a great and grand experimental program wherein tests were conducted to test the feasibility of allowing every transponder operator to communicate through a geo-stationary satellite system to the computer centers; thereby eliminating the need for the national grid of wire and cable and amplifiers.

But alas, there occurred in the midst of the testing period the most terrifying and most frightening period of solar sun spot activity ever recorded by the race of man; a period during which all communications via radio and the ether were periodically wiped out by the massive disruptive powers of the

solar generator. And the elitists, unable to "access" for days and weeks on end had become terrified when they found themselves unable to interrogate their national data storage centers; and were thereby forced to revert to their own minds and their own mental powers to continue to function. And for many, it is recorded in the transcripts of this "Magic Land's" history, this cold-turkey experience was so moving that when at last it was determined that satellite interconnection of individual transponders might never be a reliable system for as long as the sun was uncooperative, that a new movement swept over the elitists of this land.

For it was said, **"If we must return to our national grid of broken wires and cables and amplifiers, and if the price we must pay to do so without fear of sabotage of our national network is that we must extend the benefits of the keyboard transponder to any and all people of this land, so be it."**

And thus it had been done. A national system, created and monitored and administered by the government of the land was born. And within the short time frame of but a very few years every citizen of the land was tested and outfitted by government administrators with his own personal keyboard transponder. And the national network of wires and cables and amplifiers was restored and improved and under government direction every home and domicile of every type and location was "wired" for grid interconnection.

And so it functioned for yet new generations; a system conceived by few but ultimately enjoyed by all. And there developed a nation of people hopelessly "hooked" on knowledge and information and data; a nation of people who gradually became more and more dependent upon the system which answered their every question and their every need. So that, after a century of universal use of the "Open Access" system by all of the people, all knowledge and all power and all life revolved totally around the national system of interconnected wires and cables and amplifiers and computers. With each successive generation, the residents of this "Magic Land" gradually, slowly, lost their intuitive abilities to deal with a situation upon its own merits. A baby would awaken in the night crying and the mother, her breasts heavy with milk, would arise to attend to the child. But even her instincts had disappeared through centuries of non-use, and so she would access her transponder terminal with "The baby is crying; my breasts are heavy. Instructions please."

And as in all fairy tales there must be an ending to this fable. And so there is.

For into this "Magic Land" there came one day a foreigner. A man who was the product of centuries and centuries of hermit-like existence, where generation after generation after generation had continued to break their ground and sow their seeds and harvest



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you really need it.**

As you probably know, number 13 turned out to be unlucky for Sat-Com I. Its transponder #13 has developed anomalies and erratic behavior. Fortunately, the programming scheduled for that transponder was not yet on stream, so the failure was not catastrophic. This time. Because, it's a fact of life that no transponder nor even any satellite will last as long as your earth station.

So if you have a single channel receiver when your satellite channel fails, it could be very expensive for

you. You'll encounter long delays replacing the crystal, resulting in loss of revenue, loss of subscribers and loss of reputation.

If, on the other hand, you had the foresight to purchase a Hughes Satellite Receiver, you need not worry. Depending on the model you chose, changing channels could be accomplished simply with a front-panel switch or by flipping a switch from a remote location. Hughes feels so strongly about the necessity of agility, that it's the only kind of receiver we

manufacture. We also include a patented threshold extension at no extra cost.

So if you're tempted to save a few bucks on a single channel receiver, remember Unlucky 13. Then write or call: Hughes Microwave Products, P.O. Box 2999, Torrance, CA 90509. (213) 534-2146.

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their crops; all without the technological benefits of our "Magic Land."

"I am a stranger in your land," said the foreigner to the first person he met. "Can you direct me to the nearest motel?"

And the "Magic Land" citizen had asked his keyboard transponder for an answer to the stranger's question, and receiving it delivered same to the foreigner.

And so the stranger traveled throughout this "Magic Land," observant and fascinated by all that he encountered. Having never been fortunate enough to have the instant "access" of a national gridwork of wires and cables and amplifiers and computers available to him, he found all that he saw intriguing. Presently, after many months of traveling and observing, the stranger found himself one day standing before a huge marble structure in the middle of this nation's capital, and there he read scribed high above the pillared entry way to the building in an ancient script long ago discarded the words "Center Of All Knowledge." Curious, he approached the doorway, expecting to find his entry barred. Wonder of wonders the doorway was open and he entered unfettered. Inside he found row after row after row of sophisticated data storage bins, rising from the stone floor of the building to a concave ceiling hundreds of feet above him. Billions of lights blinked randomly and the silence of the great hall was in itself deafening.

For, many generations in the past this "Magic Land" had discarded as unnecessary any locks on any doors and all forms of posted sentry; for the inhabitants of his land would never enter this building without first interrogating their keyboard transponder for instructions; and the answer had been long ago transcribed for all to know, "Entry is not possible."

And so in a small section of this giant hall the stranger found a brilliantly shining keyboard not unlike those he had observed each and every citizen of this "Magic Land" utilizing dozens if not hundreds of times every day. Only this keyboard was much larger, and it bore the engraved alphabet of a language still common in his own native land, English. Pausing before the gigantic control keyboard, he read the last log entry still brightly displayed on the cathode ray tube flat wall display before him. The display bore a date more than a century past. Presently the stranger noticed a long series of push buttons blinking above the keyboard, buttons inscribed in the same ancient language "Query Not Stored." Reaching over the master keyboard he pressed in on one of these blinking buttons, and on the display screen before him appeared a message; and there he read a question complete with the automatic identification of the individual who was the source of the query.

The stranger thought to himself 'Very neat indeed...each citizen is automatically identified and when he asks a question that is not covered by the

data already in storage here or elsewhere, his question is automatically routed to this point for an answer. I'll bet that the answer provided here is automatically stored so that when other similar questions are asked, it will receive the same answer, automatically.'

The stranger's eyes returned to the logging screen where he reminded himself that the last usage of this master terminal had been more than a century prior. Generations had been born and died in the interim, and over that period of time there had been no new knowledge added to the nation's storage banks. Apparently the last surviving "thinking operator" of the master keyboard had entered into the data bank the instructions that entry into the "Center For All Knowledge" was "not possible," and from that point on no individual had entered the building, and consequently there had been no opportunity for the stored data to be updated or kept current.

A blinking query light attracted his eye. He pushed the button.

Following the automatic identifier came the question. "Should I take my family to the beach today?" The foreigner paused but a second, before he sat down at the operator's chair and responded.

"Destroy your keyboard transponder," he replied.

And then another blinking query light. And another and another. And to each the stranger repeated the same simple message.

"Destroy your keyboard transponder."

And he kept up the furious pace for a day and a night and a day...so that at the end of the sixth day, his fingers bloodied and his body aching from fatigue he stumbled out of the giant hall and into the bright sunlight of a new day.

Visiting With Oliver Swan

Readers who live and operate rural, typically small, cable systems will recall our March 1977 near-issue-long report on the antennas and electronics built by Arizona's Oliver Swan. Visitors to CCOS the past two years will also recall our bringing Oliver in to explain how he manages to make a living with as few as six subscribers per cable mile down there in extremely rural Cochise County, Arizona.

Early in February I grabbed six rolls of 3/4 inch videotape and hopped on a flight bound for Tucson. There our multi-talented CCOS video production crew led by Dana Atchley (the III, just so you won't confuse 'young' Dana with his Dad who has been Chairman of the Board at Microwave Associates for some years) met me and we drove in Dana's production van another 100 miles to see Oliver.

In one day we filled up all six rolls of videotape plus some more Dana had the foresight to bring along as we followed Oliver around. He showed us his new 40 foot tall by 75 foot wide spherical antennas that drag very high

quality Phoenix signals over 225 mile paths, explained how he builds cable line amps for under \$20 each and we 'watched' as he ran his 16 hour per day local origination/access channel for one system's 44 subscribers (and you guys in the-San Diego's moan and complain about doing a couple of hours a day for tens of thousands of subscribers!).

The highlight of the trip for me was a videotape look at Oliver's latest 'baby'; 20 foot high by 20 foot wide Swan-designed 'Spherical Reflector' for 4 GHz TVRO reception. The reflector is fixed in position and by either installing separate feed antennas, or, moving one feed antenna left and right (as in azimuth) Oliver plans to be able to 'sweep' 90 degrees of orbit horizon with a single fixed reflector. We figured the gain was down perhaps 1.5 dB from a much-more-complicated-to-build 20 foot true parabolic and as Oliver notes on videotape he has around \$1200 in this highly efficient TVRO antenna.

Now before you run to the telephone asking for Bisbee-information to get Oliver's telephone number...hear this. The antenna is scheduled for completion about the middle of March. At that time we are going back to Arizona and we are going to help Oliver check it out. We will also be shooting a videotape that will describe how you layout and build this antenna and of course we'll have the full construction plans available here in CATJ; probably along about the May or June issues. I plead with you to leave Oliver alone in the interim because he's up to his neck in the new TVRO antenna, some very interesting low cost designs for a TVRO receiver/LNA combination, while he continues to run his 12 separate CATV systems scattered over an area about the size of Rhode Island. We'll have all of the data here, and on Satellite Magazine (every program released on Satellite Magazine during March has some Oliver Swan material in it from our February visit). This was my first time to visit Oliver in Arizona and I was very intrigued with how this man does things for pennies that others spend hundreds of dollars to do. He, his wife and his family, have a very unique cable business going in the wilds of Arizona and while I am aware that his 'presence' has bothered some of the bigger operators in the area it appears to me that we can all learn a great deal from this man.

Which Brings Us To...

Oliver and I spent one evening paper designing and re-designing TVRO hardware. Swan has some very interesting bi-polar transistor mixers that he has worked out which require low LO inputs and low RF signal levels to produce surprisingly high signal (or carrier) to noise ratios. He's been designing and building his own headend and plant electronics for years; that's the reason he manages to provide rural cable service to such low subscriber density level areas. One of his systems

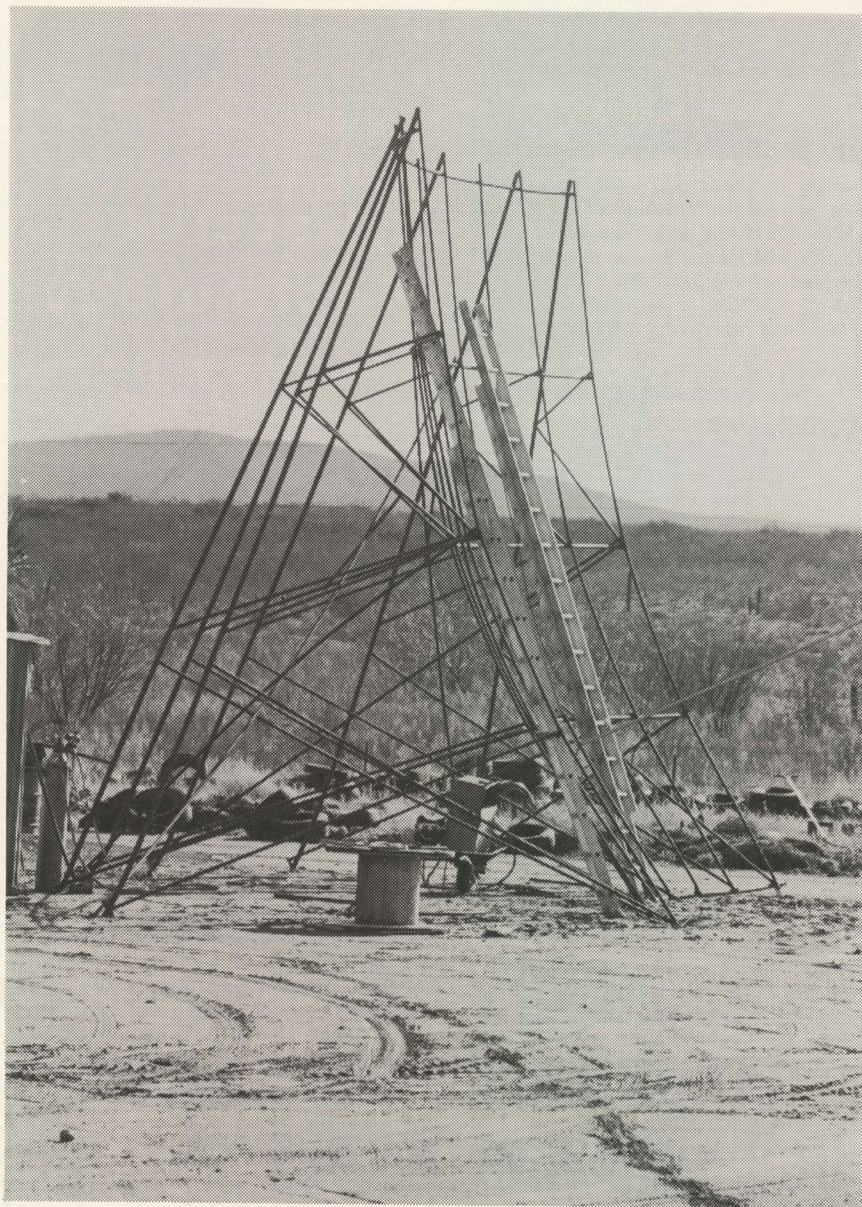
has 3 subscribers on 1/2 mile of plant. He gives them five channels with separate headend antennas and processing gear for each channel. Of course he built all of the headend electronics himself ("...cost me around \$150 for this headend...") and his line amps cost him perhaps \$20.

So I said to Oliver "Why not let CATJ put some of your headend pieces and your line amps into kits and make them available to cable systems!". He responded that many systems had talked to him about this but most people figured they weren't qualified to make home-brew line amps fly.

"OK...we'll refine the parts and the board layouts so that people can put them together and make them work when they first plug in. On top of that, we'll stand behind the kits with our guarantee that if the builder has any problems Gayland (Bockhahn) will take the non-working kit and repair it for the builder. Then we'll put together a Beta/VHS tape that takes the builder through construction and the little bit of alignment required step by step. We'll take away all of the fear of the unknown for the builder."

You see, I've had this concept for years that around virtually every cable town there are small pockets of 10 or 25 or even 50 homes which the 'master' cable system just can't afford to reach. I'm betting that cable personnel (techs, engineers, even the neophyte installers) who live and work in an area would hop at the chance to "get a little cable system on their own" if they had the chance. Using Oliver's proven rural cabling techniques, and kits of his design-proven very low cost electronics, I can see a cable system employee wiring up a 25 home area on weekends and bringing in maybe \$150 a month extra for himself. Using Oliver's approach a fellow can pay for a complete 8 channel headend, a couple of miles of plant and so on in well under a year with 25 homes and a \$7 rate. Nothing would please me more than to see 50 or 100 cable system employees turn into cable system 'owners' by employing the Swan techniques and gear.

Oliver agreed with us. So in the May issue we'll offer the first of the 'SWAN-KITS' and we'll have some videotapes



OLIVER'S TVRO SPHERICAL ANTENNA - the framework was completed during our February visit.

which when combined with a manual we will also make available will put a guy into the 'rural cable business' for Oliver's kind of bucks. All of you fellows out there that are working for somebody else had better start looking

around for some areas to wire up. In a couple of years time you might even get up to where Oliver is, with 450 subscribers on 12 separate systems. Can you imagine being a 12 system MSO and having 450 subscribers total!

Backfill On Transponder 1

In addition to the approximately 18 hours per day of KTVU programming which will be carried via transponder 1, SCS has lined up a number of other programming services that will 'back-fill' the non-KTVU operational hours.

On weekdays, between 8 and 10 PM eastern time (5 and 7 PM Pacific time) the family movie service offered by Home Theater Network (HTN) will replace the KTVU feed from San Francisco. Initially the HTN movie service will not be scrambled (we reported erroneously in our December

issue that HTN would go to a 6.2 MHz aural sub-carrier) although HTN does expect to incorporate some form of signal scrambling before the end of the first quarter of 1979.

Additionally, transponder 1 will be utilized prior to the sign on of KTVU each day (7 AM to 10 AM eastern time) to carry free-of-charge programming to cable services from such firms as Satori Productions, Phipps & Company, American Cable Network, Blue Hill Educational Systems and others. In addition to this, Ed Taylor reports that many of the larger cable systems now creating their own local

origination programming will be showing their programs on transponder 1 during this "pre-KTVU-sign-on" period each day. Cable operators will be encouraged to tape these early morning feeds via transponder 1 for their own use at times that differ from the actual satellite feed time. This 'backfill' operation has been given the operating name of 'Satellite Program Network' (SPN) and a six person advisory board made up of some of the cable industry's leading producers of local origination programming are serving in the capacity of a selection committee for the programs to be distributed via SPN.

Satellite Technology News

KTVU Oakland, San Francisco
Oakland, California

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Terminal Deregulation

Late in January the FCC released its long-ago announced inquiry into whether or not the present TVRO licensing system is required in light of the rapid growth of the cable television (and other) users of the service.

There are presently two ways to get a TVRO license; the three-step process followed by cable television companies, and the 'experimental terminal' route (see CATJ, Coop's Cable Column for April 1978).

Under the 'three-step procedure' the applicant must go through a frequency coordination study (by a firm such as Compucon, CommSearch or SAFE) and the preparation of the actual applica-

tion; followed by the granting of a CP (construction permit) and finally followed by licensing of the terminal itself. The firm selected to do the frequency coordination work typically determines what level of terrestrial interference is likely at the proposed site, how 'rain scatter' will affect the terminal, and whether the antenna-LNA-receiver chosen for the terminal will provide an 'adequate' (3 dB) margin for service above the receive-systems's noise level.

The Commission now feels that perhaps the use of satellites has progressed to the point where potential new applicants for the service may

wish the opportunity to assume some of the licensing burden for themselves. For example, if the Commission were to offer the option of terminal construction without the mandatory frequency coordination, would cable systems find such an option attractive? The Commission is suggesting that they might prefer to have two different (optional to the terminal builder) routes open for TVRO operation; in the first path, the procedure would be very similar to the present process, with a few shortcuts to eliminate some of the existing red tape. In this option, the Commission would continue to provide 'protection' for the terminal against new-build terrestrial interference down the road into infinity.

In the second option the terminal builder would waive any right to protection, although he might (on his own) have one of the frequency coordination firms do a low cost (such as \$100) "look" at his site reference presently operating or planned terrestrial microwave. The terminal would be simply 'registered' with the FCC (much like the present CATV signal carriage/operation registration).

Would a non-coordinated TVRO have to be designed so as to maintain the 3 dB C/N "margin" which licensed terminals are supposed to have? How would a non-licensed terminal get into the mainstream of approved signal carriage (see Coop's Cable Column, this issue)? These and other related questions are what the FCC inquiry is all about. The FCC had originally set a February 23rd date for all comments to be in on the inquiry but it is likely that the comment deadline will have been moved ahead into March. If you want a current run down on the status of this inquiry, contact Bill Lombardi at the FCC's Common Carrier Bureau; 202-632-5930.

Transponder 1 - Intentional Interference?

From around January 28th until the 2nd or so of February RCA SATCOM F1's transponder 1 suffered interference from what is believed to have been a clandestine signal source.

The transponder 1 signal (KTVU, San Francisco, SPN, and HTN) was degraded by various levels of interference that caused the signal to lose sync and 'roll' on most receivers/monitors. The appearance of the interference was a series of horizontal lines that 'streaked' through the picture. All of the probable and a host of non-probable interference sources were methodically checked out. All uplink terminals known to exist in both the commercial and military worlds were tracked down one by one, and written off as each was found not to be the source of the interference.

The interference appeared to consist of one or two separate modulation index signals. It exhibited a rhythmic pattern being on and then off and then on again with typically 3 to 6 second intervals between the on and on peaks. However the time from one 'pulse' to

CATV TVRO STATISTICS - MAR. 1979

Applications Filed/FCC	Nov. 1978	Dec. 1978	Jan. 1979
1) 11 meter	0	0	0
2) 10 meter	1	1	1
3) 7 meter	1	2	3
4) 6 meter	9	6	5
5) 5 meter	54	56	70
6) 4.5 meter	42	6	16
Total Apps.	107	71	95
Cost Max.	\$209,000	\$106,820	\$60,000
Cost Min.	\$9,995	\$12,600	\$17,500
Avg. Cost	\$31,883	\$31,431	\$31,597
Channels Requested*	241	173	201
Average Channels	2.3	2.4	2.1
Requesting WTCG	57	40	43
Requesting CBN	54	21	44
Requesting HBO	60	37	51
Requesting MSGE	25	12	17
Requesting SHOWTIME	21	14	6
Requesting WGN		10	12
Requesting KTVU		3	6
Requesting Warner's Nickleodeon		13	0
Avg. Cost Per Channel	\$13,862*	\$12,935*	\$14,975*
TVRO's Licensed/FCC	85	73	76

Notes: *—may no longer be valid measurement stick due to method applicants now file with FCC. Data compiled from FCC sources, advances ahead one month with each issue of CATJ.

the next 'pulse' varied in a random fashion and we understand no analysis to date has been able to put it into a rigid format with any repeat pattern that makes any sense.

Sources at SCS indicate that the interference became so bad at several points that they were being deluged with complaint calls from cable systems carrying the KTVU signal. SCS engineering people and RCA engineering people cooperated to track and record the interference and for brief periods of time the uplink site feeding the normal (i.e. KTVU or HTN) service to transponder 1 was shut off so that a 'clear recording' could be made of the interfering signal. After several days of this exercise the FCC was handed the problem. After slightly less than a week of activity the interference went away and to date it has not returned.

This is not the first time that this particular form of interference has been noted in the satellite service; sources at Western Union had a similar situation (also on their transponder 1, in the same approximate frequency range) several years ago. In the Western Union case the interference also went away one day and simply did not return.

Tracing a clandestine source of interference (whether it was an intentional source of interference or accidental is

not important here) is at best difficult. From the ground the uplink source of interference cannot be determined pre-

cisely as to even its approximate location. As one engineer pointed out, "it could be located anywhere south of the

CATJ SATELLITE MAGAZINE - SCHEDULE

CATJ's weekly RCA SATCOM F1 distributed 'video news' magazine, "Satellite Magazine", has an interesting schedule for the month of March. Air dates are Thursdays, on transponder 24, at 12 noon eastern/11 AM central/10 AM mountain and 9 AM pacific time.

March 1st (first shown February 22) - Satellite Magazine visits with **Oliver Swan** in Cochise County, Arizona where Oliver details his knife edge refraction reception techniques, explains how his **spherical** (half-bolic-like) off-air **antennas** work over 225 mile VHF paths and shows the industry how he puts together nine channels of off air television headend electronics for less than \$200. Also on this program, **Tom Humphries** of **SCI** and **David Alvarez** of **Microdyne** discuss installation and maintenance problems with TVRO LNAs. Program number seven.

March 8th/15th - Satellite Magazine is back at the **Oliver Swan** 'ranch' in southeastern Arizona where Oliver describes homebrew yagi construction, a solid state cable line amplifier he builds for under \$25, a series of other innovative do-it-yourself Swan cable system electronics units which enable him to serve rural areas with as few as 6 subscriber homes per cable mile. Program number eight.

March 22nd/29th - In a final visit to the **Swan ranch** Satellite Magazine looks at Oliver Swan's latest project - a 20 foot by 20 foot **spherical antenna** for **4 GHz satellite reception**, and samples some 'Swan Cable' local origination. Swan's home-based system averages around 16 hours a day of local/access origination for 44 subscriber homes. You have to see it to believe it! Program number nine. Videotape copies (1/2 inch off-the-shelf, 3/4 inch on special order) are now available to CATJ readers who do not have access to a TVRO terminal on Thursday mornings. See special insert card between pages 8 and 9 in this issue.



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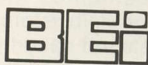
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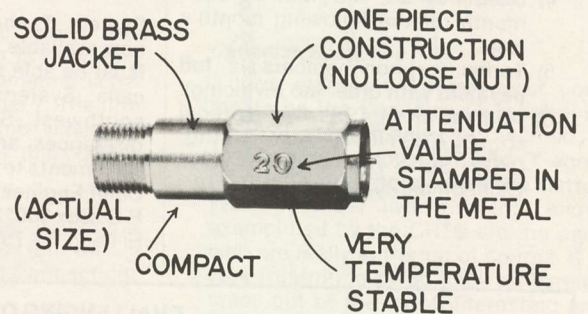


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Arctic circle and north of Bogota (Columbia), between Bermuda on the east and Hawaii on the west". For the few days the interference was present a long list of "theories" evolved; running the gamut from "...a Russian trawler just seeing if it could be done" to "...a military radar run amuck" to "...a 'hobbiest' just getting his kicks".

Working backwards, a ten meter dish with a 250 watt output transmitter will 'saturate' the input of the transponder. The interference level varied in intensity, with several sources reporting it appeared to be as close as 10 dB in carrier level to the KTVU/SPN/HTN uplink signal. Backing down from 250 watts 10 dB would suggest that a 25 watt (output) transmitter into the same ten meter antenna, or approximately 50 watts into a 6-7 meter antenna or 100 watts into a 4.5 meter antenna could conceivably create the same type of

interference as was noted.

Kip Farmer at Southern said it best. "Why us???". For now the interfering signal is gone and it remains unidentified. The fact that it went away before being located (as to source) has a number of satellite people uneasy. "I wish it had stayed around...until we found out where it was coming from. Now we have the fear that it may come back at anytime."

Revised Transponder Listing

RCA SATCOM F1 transponders currently in use for CATV program relay service are as follows:

Transponder	Service
1	KTVU (2, San Francisco)
2	PTL
3	WGN-TV (9, Chicago)
4	out of service
5	Nickelodeon (daytime) Star Channel (nighttime)

6	WTCG, UPI 'Newstime'
7	ESP (*)
8	CBN
9	Madison Square Garden Events, C-SPAN
10	SHOWTIME (west)
11	Star Channel
12	SHOWTIME (east/central)
13	out of service
14	KTBN (Trinity)
16	FANFARE
18	Reuter's data services
20	HBO spare, other occasionals
21	
22	HBO (west); Modern Talk- ing Pictures
23	TAKE-2 (HBO family)
24	HBO (east/central)

* - Entertainment and Sports Programming Network is presently conducting limited programming; see separate report here.

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- 3) CLASSY-CAT advertising is also available to non-members at the following rates: 50 cents per word with a minimum per insertion of \$20.00. A charge of \$2.00 per insertion is made for blind-box numbers or reply service.
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System Technicians—Openings are now available for qualified technicians. Must be able to handle routine service calls. System located in the sunny southwest. Send qualifications and references and include financial requirements to:
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El Paso, TX 79901

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To supervise and administrate all plant personnel in repair, maintenance, construction and installation. Must know system design and be able to train other plant employees in their jobs. Systems available are located in Southern New Jersey. Send resumes to Mr. Ed Shaman, Teleprompter District Office, 6820 Ventnor Avenue, Ventnor, New Jersey 08406. EOE/M-F

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FOR SALE—Jerrold Starline One amplifiers, SA-2 and SA-5, less cable equalizers. Some feeder makers, housings and rubber weather gaskets available. Also available SX-1 line extenders. See Tv Co., Mexico, Mo. Phone 314-581-6666.

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PBS Cable Feed?

One of the stories making the rounds in satellite circles these days is that PBS (the Public Broadcasting System), anxious to find a way to provide its satellite fed service to cable systems, is looking at creating a 'composite simulated broadcast service channel' to be distributed via satellite to those cable systems that wish the service. The concept would be that this special channel, unlike the present three full-time satellite channels on WESTAR I, would be a 'broadcast channel' in the sense that it would provide cable systems with satellite relayed off-air PBS signals. Under the present 'PBS WESTAR' use, the programming relayed via WESTAR is network feeds with plenty of 'dead air' and no particular continuity for normal reception use. **The plan now circulating** would allow several existing PBS stations, with uplink capabilities, to share a single satellite transponder through the course of the broadcast day with each PBS station participating sending some its own off-air broadcast signal back to the satellite to create a total 'composite PBS day' via satellite. In this way cable systems located where PBS reception is not available could take the satellite feed and add PBS programming and still be carrying 'broadcast signals'. This will overcome the present PBS copyright and program use rights hurdle which prevents PBS from allowing cable systems to 'tap into' the WESTAR I PBS feeds.

Portable 6 Meter Uplinks

United Video, Inc. has filed an application with the FCC to allow it to become the first operator of a six meter uplink station for video (and other) originations directly to a satellite for relay to distant ground receive terminals.

The first portable terminal designed by United will become what is estimated to ultimately be a multiple terminal package perhaps numbering as many as 50 such terminals available for use at any point within the United States or the world on short notice. The transportable terminal has been designed to be a completely self contained uplink origination facility to be moved via its own over-road trailer, via rail (flatcar) or via the cargo hold of an L-100-30 aircraft. The system has been designed by United and by the builder of the package under contract with United; Collins Division of Rockwell International.

The six meter uplink terminal is completely self contained with a collapsible six meter dish and a fiberglass shelter to house the electronics. Collapsible microwave towers are also included so that the terminal can be situated in a shielded location where

terrestrial interference requires special shielding of the uplink terminal.

United is making the transportable terminal package(s) available for either short term rental or long term lease and it is anticipated that the terminals will see frequent use by the three U.S. networks as well as Intelsat service users in the years ahead. The United service, according to Roy Bliss, includes all frequency coordination work, set up and operation by United personnel. All the user has to do is show up with his video and audio feed and he is in business to the appropriate satellite. The cable industry itself is another likely user of the United six meter transportable earth terminal system; several industrious cable firms attempted to provide coverage of locally available sporting events through the satellite during 1978 but were unable to pull off the events because of a lack of just the type of package which Bliss's firm is now putting on the road.

Modern Talkies Up

Modern Talking Picture Service is began programming approximately five hours per day on transponder 22 on January 29th. The service runs ahead of the regular HBO (western) sign-off, featuring travelogue films, industrial films and other client-sponsored films. The service is available at no charge to cable systems and may be carried "Live" or on a tape delayed basis as suits the needs of the cable system.

For additional information, contact the firm at 2323 New Hyde Park Road, New Hyde Park, N.Y. 11042 (516-437-6300).

ESP Has Schedule Up

The Entertainment and Sports Programming Network (ESP) is operating on an abbreviated programming schedule on vertical transponder 7. The firm plans to have a 'full time schedule' available on transponder 7 this coming September.

During the next couple of months the events scheduled are as follows:

- April 10th** - University of Connecticut vs. Army (lacrosse)
- April 21st** - U-Conn vs U-Mass (baseball, double header)
- April 24th** - Woman's softball
- April 26th** - U-Conn vs. Airforce (lacrosse)
- April 27th** - U-Conn vs. Northeastern (baseball)
- April 28th** - U-Conn vs. Vermont (baseball, double header)

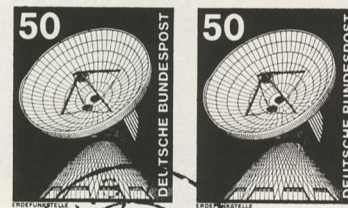
When the full service package is available this fall ESP will be offering New England regional coverage including 11 different types of sport events. The rate schedule is 48 cents per subscriber home per year at the top

end with discounts of up to 40% available for 'early-sign on' and large subscriber bases. ESP is constructing its own uplink facility near Bristol, Connecticut which will include a new office facility as well as a studio facility.

For further information contact ESP at 203-747-6847 or write them at 319 Cooke Street, Plainville, Ct. 06062.

Satellite Stamps

There are those who forecast that in coming years a large portion of the U.S. communications volume will shift (in one form or another) to satellite message delivery. These same people see the day when the increasing costs of per-piece mail delivery will rise to the point where the decreasing costs



of satellite communication time will make satellite delivery of 'hard copy' the most economical information exchange system.

At least one federal government has issued a commemorative stamp which recognizes the importance of satellite communications in their economy. The Federal Republic of (West) Germany is currently issuing the stamps shown here, stamps from a letter recently received from a CATJ reader in Germany. In that country at least "satellite mail" is a reality!

Canadian Response

"I've read with interest your comments on the Canadian Government's (lack of) performance in the field of satellite technology. I couldn't agree more with your thoughts on the matter. We who must live with this idiocy exemplified by the CRTC are the ones who are really suffering of course. It is very frustrating to be kept by bureaucracy out of the most interesting and innovative form of communication in the history of mankind. I don't know how much longer Canadian cable operators are going to put up with this situation. By the way, I sent the CRTC complimentary copies of the two articles appearing in the September and October issues of the Journal; anonymously of course(!). Keep up the reports on the Canadian scene; perhaps it will embarrass our Czars into some type of positive action."

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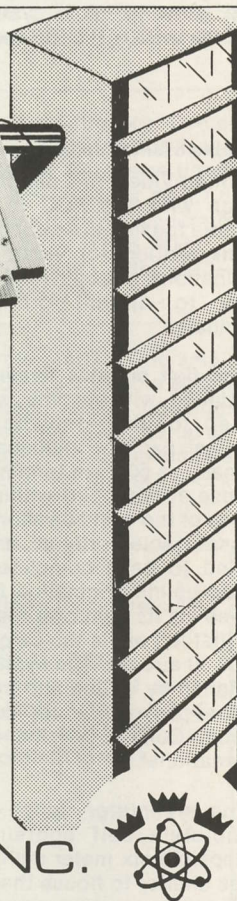
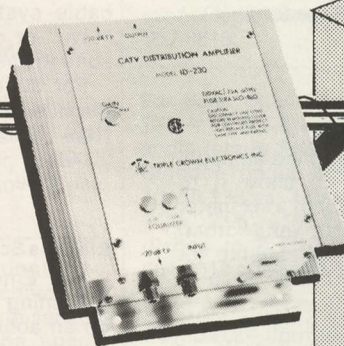
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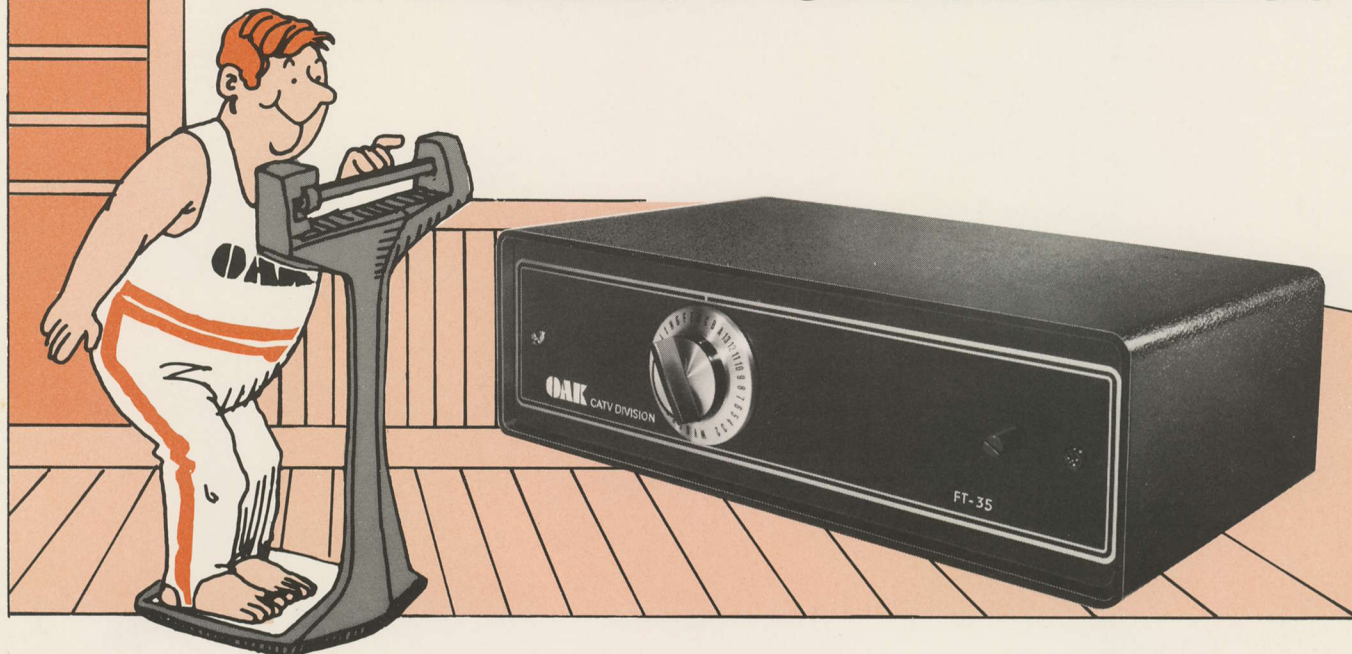
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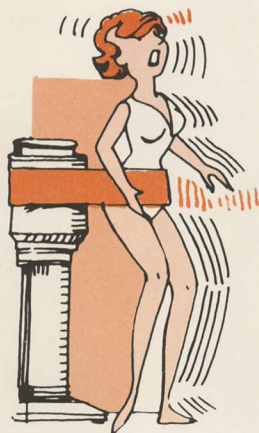


New Oak Trimline FT Reduces Overhead ...Builds Performance



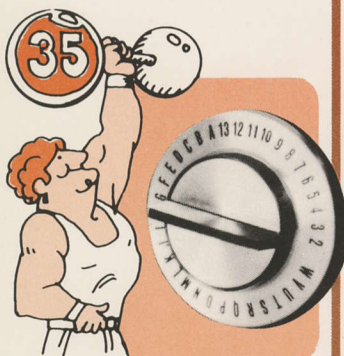
Trims hardware costs— not quality

Now you can trim your hardware costs without shaking loose from famous Oak quality and performance. Trimline FT, an economy 35 channel converter, with manual fine tuning, is a new addition to the high-quality Trimline converter series. Very high adjacent channel rejection and low noise figure ensure unmatched reception quality.



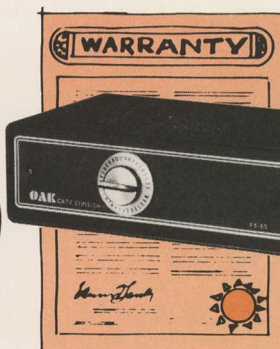
35 channel strength

Trimline FT allows for full 35 channel coverage, with accurate tracking for minimum customer fine-tuning. Each channel has its own tuning potentiometer and frequencies are factory set to assure channel selection accuracy. Even if you don't need 35 channel capability, Trimline FT allows room for growth.



Guaranteed fitness for all

All Oak products are warranted for one full year, no matter how much of a work-out they receive. We support our warranty with rapid repair turn-around. We can back our products better because all Oak products are designed, carefully built and inspected by Oak people in company owned facilities.



You're always a step ahead with Oak

Oak maintains one of the industry's most complete research and development facilities to ensure that our products reflect the best available technological improvements. That's always been our commitment to you and to the industry. The Trimline FT is another example of how Oak sets the pace to keep you a step ahead!



OAK Industries Inc.

CATV DIVISION / CRYSTAL LAKE, ILLINOIS 60014

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When Quality Counts . . .



. . . count on

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CATV DIVISION

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